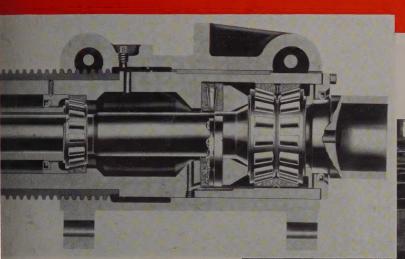
EEL

ICTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882

Bearings Improve Production - Reduce Cost In Modern Seamless Tube Mills





A symbol of quality for any piece of equipment with which it is associated

KEN Bearings to a piercing mill thrust block.

up of a modern Timken Bearing Equipped piercing wilt by Aetna-Standard Engineering Company and ted by the Youngstown Sheet & Tube Company.

SEARCH LIBRARY

WERES PROGRESS ADMINISTRATION

AKEN Tapered Roller Bearings improvements ever made in the production of seamless are of TIMKEN Bearings has lefficiency to such an extentialled really modern unless it ipped.

used on piercing mill roll necks
o promote greater accuracy,
my. With friction and wear
ust and combined loads adeand permanent alignment of

moving parts assured, operating speeds can be higher . . . maintenance costs are lower . . . power consumption is reduced.

If you are considering the purchase of a new seamless tube mill make sure that it will be truly *modern* now and for many years to come—specify Timken Bearing Equipped.

TIMKEN TAPERED ROLLER BEARINGS



The Pennsylvania's new Broadway Limited rolls on TIMKEN Bearings. GIDE—as you ride a Timken Bearing Equipped train.

nother true ca neralle brom the Allis-BUY THE EQ HAT PAYS FOR

Large Pulverizing Company Saves \$1,656 Per Year PER DRIVE by Changing to Allis-Chalmers Texrope Drive! Learn How You Can Get Extra Savings ... With the **Equipment That Pays For Itself!**

When you run your drives 24 hours a day, 300 days a year, you've got to have drives that give you the best service . . . at the lowest possible cost! And when you install a drive that saves you 23c an hour . . . \$1,656 per year PER DRIVE . . . that's the kind of savings you want in your plant!

That was the experience of the National Pulverizing Company, Millville, N. J. after installing a 150-hp Allis-Chalmers Texrope Drive! They found that the Texrope Drive required an average of 32 amperes at 440 volts less than the type of drive formerly used . . . a point verified by the utility company . . . an actual power saving of 23c an hour! Nor was this all-

For Allis-Chalmers Texrope Drive gave them a new improved dependability of performance so necessary when running 24 hours a day ... a lower maintenance with drive and machinery...a longer life to transmission units!

Allis-Chalmers Equipment Pays Profits!

Whatever your operating problems, let Allis-Chalmers engineering and Allis-Chalmers equipment offer you the answer - with high-efficiency performance . . . at dollar-saving cost!

Get the story of Allis-Chalmers 90 years of advancing with industry . . . how Allis-Chalmers equipment can cut your operating costs . . . improve your workers' comfort and safety . . . increase your year's profits!

Let performance facts show you why you should use Allis-Chalmers equip-

TEXROPE DRIVES efficient . . . an impo no in the amazing saving ma this 150 hp Texrope I /e National Pulverizing C N. J. A second simila recently installed.

ment. Call the district of There's a trained engin it is to help you solve y problems. Or write det Chalmers for the whole too Equipment that Pays for

PRODUCTS ENGINEERED TO PAY FOR THEMSELVES

Electrical Equipment • Power Transmission Equipment • Electrical Equipment • Power Transmission Equipment • Steam and Hydraulic Turbines • Blowers and Compressors • Engines and Condensers • Centrifugal Pumps • Flour and Cereal Mill Equipment • Boiler Feedwater Treatment • Saw Mill and Timber Preserving Machinery • Crushing, Cement, and Mining Machinery • Power Farming Machinery • Industrial Tractors and Road Machinery



MILWAUKEE WIS



ength—increased capacity and low cost with Mayari R

provides, at a low cost, the strength of an and the workability of a mild carbon steel. alloy, high-strength steel that fills a broad range between low-cost structural steel and alloy steels in the stainless class.

point of Mayari R is approximately twice a carbon steel. As a result, design based on ows a weight reduction in the structure of 50 per cent. The consequent gain in capacity y valuable in transportation units and

ayari R costs more, pound for pound, than n steel, the weight saving possible with ffords a finished-job price approximately the at of structural steel. Re-design to take ad-Mayari R properties will allow the greatest

orkability and Weldability

v carbon content and high ductility, Mayari workable. Its hot- and cold-forming properactically the same as mild carbon steel. It ppreciably air-harden. Heat treatment is unnecessary after forming. All the usual electric and gas methods of welding can be used with Mayari R, with methods and procedure similar to those with carbon steel.

Great Corrosion Resistance

A resistance to atmospheric corrosion of from five to six times that of mild carbon steel, and from two to four times that of copper-bearing steel, is shown by long-time tests on more than 15,000 test specimens in industrial atmospheres.

The Steel of a Thousand Uses

Mayari R presents tremendous possibilities and advantages to all manufacturers. It extends the scope of the designer, utility to the user, and economy to the owner. The decided reduction in deadweight and corresponding increase in pay load in scores of transportation units afford definite economies. Increased life under corrosive atmospheric conditions adds materially to the service value of many products.

Detailed information on Mayari R is contained in a new catalog. We shall be glad to send you a copy and to confer with you on the profitable adaptation of Mayari R to your own requirements.

THLEHEM STEEL COMPANY



4. June 12, 1939, issue of STEEL, published every Monday at Cleveland, O. Entered as second-class matter at the postoffice, Cleveland, under act of March 3, 1879. U. S. and Canada: 1 year, \$4; 2 years, \$6; foreign countries, 1 year, \$10; Current issues, 25c.

J&L DEVELOPS A NEVER-BLINKING EYE TO MAKE A BETTER STEEL FOR YOU

With this invention—for the first time, scientific control of the Bessemer process is accomplished. Today J&L converters produce constantly uniform quality steels that work better, process easier—that clear the way to new uses—new industries—greater employment.



"The forty-foot flame you see shooting from the mouth of that Bessemer is the burning off of impurities as compressed air boils through the molten iron within the vessel, 'con-

verting' it into steel. At night, it is that colorful flame that paints the sky with the steel mill's aurora. To most of us the flame itself has little meaning, but to steel men it is the key to quality in Bessemer Steels.

"The Bessemer process was discovered more than eighty years ago and brought about this age of steel. I years this operation has been wholly controlled by the blower—the man you see there at the controls. Let that sun-bright flame, blowers have estimated the final change in flame characteristics to catch the 'end-public blow—the essential factor in obtaining the required quality. But the most skilled blowers are only human. however expert, are not precision instruments—they vary in vision and suffer the same strain and fatigue as mine. Accordingly, the desired quality of Bessemer Steel has varied from blow to blow.

"Today—here at J&L—the Bessemer process is on a scientific basis for complete quality control. Years our research metallurgists, aided by the facilities of our new Pilot Plant Laboratory—the only one of its k made this precision control method possible for the first time in the industry. Its feature is a tireless, never-blind electric eye that looks into the heart of the Bessemer flame and reads and records the story of the steel with a accuracy. This new method—'Bessemer Flame Control' these men call it—is functioning in the control of the l watching now. The molten metal boiling in that fiery vessel is destined to emerge J & L Controlled Quality Besse





ones & Laughlin Steel Corporation

From a drawing by ORISON MacPHERSON

his new development in the old process there comes in a new era of steel-making—producing steels that sier and more economically for you and all other J & L customers. Never before could you have Bessemer uniform in quality as those we are making here today—steels that pilot the way to new applications, new and an era of great employment. The Bessemer Flame Control is another J & L development that makes our p with industry one of profit to all who use steel—and this includes all mankind as we all enjoy the benefits and service of steel in our daily lives."

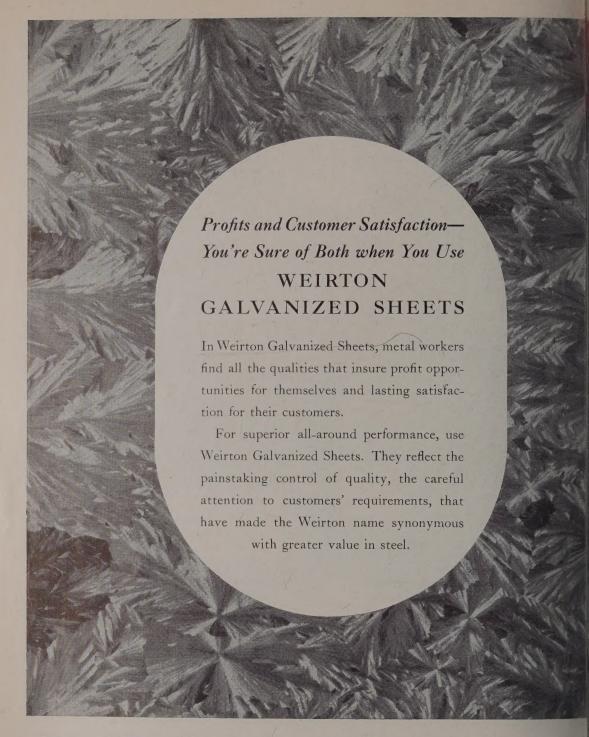
(Note: Bessemer Flame Control is one of several methods on which patent applications have been made by Jones & Laughlin Steel Corporation.)

ES & LAUGHLIN STEEL CORPORATION

ICAN IRON AND STEEL WORKS
SBURGH, PENNSYLVANIA



PARTNER IN PROGRESS TO AMERICAN INDUSTRY



WEIRTON STEEL COMPANY • WEIRTON, W. V.

Boston, 1324 Statler Office Building; Chattanooga, Hamilton Bank Building; Chicago, 2120 Builders Building; Cincinnati, 2606-7 Carew Tower; Cleveland, 1217 Leader Building; Denver, John S. Worthington Co., 511-513 Mercantile Building; Detroit, General Motors Building; New York, 405 Lexington Avenue; Philadelphia, Broad Street Station Building; Rochester, Genesee Valley Trust Building; San Francisco, 824 Sharon Building; St. Louis, E. R. Hensel Company, Cotton Belt Building; Montreal, Quebec, A. C. Leslie & Co., Ltd., P. O. Box 1420; Toronto, Ontario, A. MacNish, 357 Bay Street.

DIVISION OF

NATIONAL STEEL CORPORATION

what a PHILLIPS SCREW thinks about

ell, I just got driven home as smoothly and comfort-

as though I were riding in a limousine. short while ago I was in a box with some other llips Recessed Head Screws and then this fellow picked up and tucked me onto the end of a driver. I hung on dear life, and even when he reached downward to get to driving position, I didn't fall off. No ending up in a

The power driver turned pretty fast, but I kept on the traight and narrow, refusing to go crooked. It didn't nurt a bit. The tapered driver fit so snugly into the recess that the operator didn't have to use much pressure. I went through the material as though it were butter.

Despite the dizzy pace, I didn't lose my head (of course, my family are famous for keeping their heads about them), and there was none of the shearing action

So here am I, safe and sound, and up to my neck in that causes burrs on slotted screws. work. I have a secure grasp on things and I'm certainly not the type to go on the loose. And if anybody says I'm tight, that's all right because I am tight. And if you want to be tight with money—I'd advise you to look up the rest of my family. Our coat of arms reads, you know, "It Costs Less to Use Phillips

Screws." P.S. You can get some pretty interesting information on how thousands of firms have lowered assembly

costs. Write for free folder to any of the firms listed below. No obligation.



If you knew YOU MIGHT CHANGE

YOUR MIND ABOUT

FASTENING COSTS

MACHINESCREWS

SHEET METAL SCREWS

WOOD SCREWS

STOVE BOLTS

RECESSED

HEAD SCREWS

your plant to cut fastening costs and improve assemblies. Address one of the firms below for free copy.

This Booklet will help

hods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,388. Other Domestic and Foreign Patents Allowed and Pending.

MERICAN SCREW CO., Licenson Providence, R. I.

RIGHT WAY

HE WRONG WAY

CHANDLER PRODUCTS CO. Euclid, Ohio

CONTINENTAL SCREW CO. New Bedford, Mass.

CORBIN SCREW CORP.
New Britain, Conn.
THE LAMSON & SESSIONS CO.
Cleveland, Ohio

NATIONAL SCREW & MFG. CO. Cleveland, Ohio PARKER-KALON CORP. New York, New York

PHEOLL MFG. CO. Chicago, Illinois

RUSSELL, BURDSALL & WARD BOLT & NUT CO. Port Chester, N. Y.

SCOVILL MANUFACTURING CO.

LESS TO PHILLIPS

To the Man who sa

HERE'S PROOF!

"We make cold pressed nuts. With the steel formerly used, we processed from 4000-8000 lbs. of nuts per day. Last month, using U·S·S Controlled Steel, our records show we processed from 8000-11,000 lbs. per day, about the maximum that can be obtained on our machines. Have about doubled our output. Our production jumped 700% between tool settings.

"On one set of dies we formerly processed 10 to 20 tons of material. We now process 140 tons. 400 to 3000 nuts was the best we could get with one punch—now we get 20,000. Do you wonder we're enthusiastic about U·S·S Controlled Steels?"

MORE PROOF!

"We make connecting rods, cams, front axles and other automotive forgings, Ease of forging, well-filled sections, and uniformity in heat treatment are advantages that U·S·S Controlled Steels have shown in our plant. Freedom from trimmer cracks and quench cracks, together with marked toughness after heat treating, is also imparted by these steels. So is definite control of hardness from center to outside of each product. By using U·S·S Controlled Steels and our special agitating equipment, we've minimized the scale effect on hardenability, and in addition have materially reduced cleaning costs through this freedom from scale.

STILL MORE PROOF!

"We make screw machine parts. We supply an infinite variety of specialty products to fabricating shops, whose requirements are both specific and different. Our cold drawn steel requirements are rigid from the standpoint of machinability, finish, and uniformity of physical characteristics. When our products are subjected to heat treatment, they must have uniform properties, which can only be secured by careful control in the manufacture of the steel. So, in buying cold drawn bars, we specify U-S-S Controlled Steels—both Open Hearth and Bessemer—to provide the uniformity so essential in keeping our customers satisfied."

UNIT

ill have to show me

ITE consideration of the following cases, typical of hundreds in

A manufacturer making nuts and bolts formerly changed drills 3 times ry 8 hours. Using U·S·S Controlled Steel he now runs 26 hours straight, out change—drills last 9 times as long.

A prominent manufacturer of an automobile specialty specifies coarse n structure for one size, and fine grain for another—and gets it in U·S·S trolled Steel. Now obtains uniformly hardened structure with a single idardized heat treating schedule.

A chain manufacturer is reeling up miles of finished chain made to very rictive physical properties. With U·S·S Controlled Steel he has inused physical properties at least 25%—with no increase in cost.

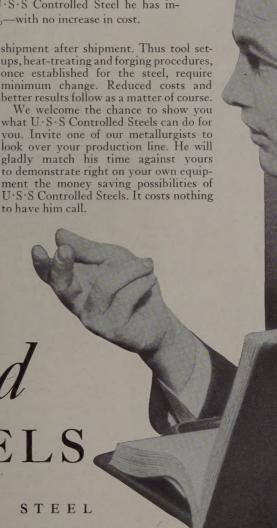
sers, too, were from Missouri first introduced U·S·S Coneels. Today in their shops and ers, combined cost reductions undreds of thousands of dollars o you wonder they swear by rior carbon steels?

·S Controlled Steels, control er than the mere close adheremical specifications. It has to ontrol of other vitally imporerties—forging and machining response to heat treatment, etc.—which so largely deterther production in the user's be wasteful or economical.

·S Controlled Steels we have quite possible to furnish not grain or coarse grain steel as reut to maintain uniformity in

shipment after shipment. Thus tool setups, heat-treating and forging procedures, once established for the steel, require minimum change. Reduced costs and

We welcome the chance to show you what U·S·S Controlled Steels can do for you. Invite one of our metallurgists to look over your production line. He will gladly match his time against yours to demonstrate right on your own equipment the money saving possibilities of U·S·S Controlled Steels. It costs nothing to have him call.



ntrolled

3 STEELS

GIE-ILLINOIS STEEL ORPORATION

Pittsburgh, and Chicago

iteel Company, San Francisco, Pacific Coast Distributors



helping its customers Linde Helps Itself

N Linde products and cesses "go into your plant" g equally important goes n-Linde Process Service. ice is designed to help the use Linde products to do job. It works day-in and o help find new ways to production, make a better or cut costs.

ping its customers, Linde of its products, Linde must constantly help custrol process costs. That's de customers feel that omething more vital in tions with Linde than just of the products used.

Process Service takes many backed by a co-ordinated, de organization which inalert research staff. Whatform of service you rec'll find it is geared to your I needs. Any Linde man you more about it. The Products Company, Unit Carbide and Carbon Cor-Offices in principal cities.



LINDEWELD MULTI-FLAME PROCESS—Strong and tough welds of uniformly high quality can be obtained when joining pipe or steel plate by this Linde process. It is extremely fast and consumes a minimum of oxygen and acetylene. Oxweld 6- and 4-flame tips, high-speed welding rod, and a special, easily-learned technique make the process possible. Linde service can help you use it to do a better job at lower cost.

IS MORE TO SURVEY THAN "EVERYTHING FOR WELDING AND CUTTING"



SOFTENING—The same oxyflame used to "flame-harden" arts, can be used to soften ardened areas resulting from ting, shearing, or welding of igh-carbon or alloy steels.



UNIONMELT WELDING—A revolutionary, fully-automatic electric welding process—developed by Linde—with which one-pass welds of high quality can be made in any commercially used thickness of steel at amazing speeds.



BRONZE-WELDING — This widely used oxy-acetylene process provides a means of permanently bonding similar or dissimilar metals, without melting or seriously affecting them. It is also used to build up worn surfaces.

OXYGEN . NITROGEN . HYDROGEN . RARE GASES AND MIXTURES . UNION CARBIDE O-LITE ACETYLENE . OXWELD APPARATUS AND SUPPLIES . UNIONMELT WELDING

"Linde," "Union," "Prest-O-Lite," "Oxweld," "Lindeweld" and "Unionmelt" are trade-marks of Units of Union Carbide and Carbon Corporation.



Basic Open Hearth and Bessemer (Annealed, Regular, Hard Drawn, Sul Coated Extra Bright, Copper Coated, Liquor Finish, Galvanized), Spring Wire, *Estoinless Steel Wire, *Toncan Copper Molybdenum Wire, Cold Heading Wire, Wi

NIFORMITY you're looking for, try FPUBLIC WHEE

the thing to obtain wire which provides with all of the qualities you desire—
lite another to obtain wire in which qualities are consistently uniform—
fter coil—shipment after shipment.
Let's an important reason why many facturers of wire products standardLet Republic Wire. They want certain the qualities—they want wire that can depend upon for uniformity—
want wire that will help them to cut ating costs, to lower spoilage and

to improve the quality of their products.

Every wire user has his own ideas about the wire he uses—has his own specifications. Tell us what you want in wire—strength, temper, fabricating qualities, finish. Let us send a shipment of Republic Wire. Try it on your machines. Then remember this: you will receive wire of the same uniform qualities every time you order.

REPUBLIC STEEL CORPORATION WIRE DIVISION: 7850 SO. CHICAGO AVE., CHICAGO, ILL. GENERAL OFFICES: CLEVELAND, OHIO



NION DRAWN STEEL DIVISION
PERGER MANUFACTURING DIVISION
(ILES STEEL PRODUCTS DIVISION
TRUSCON STEEL COMPANY
STEEL AND TUBES, INC.

Any type-

Standard, A.S.M.E., Elliptical, Shallow Dish... flanges for riveting or welding... diameters from 9½" to 172"... thicknesses from 964" to 4".

Shown above the tion of the WOR Flanging Departments of the tion o

and Dished fields produced promp under executive supervision

CALL THE NEAREST REPRESENTATIVE

New York, N.Y., Wm. C. Dickey · Pittsburgh, Pa., McKee-Oliver, Inc. · St. Louis, Mo., Hubbell & Sharp · San Francisco, Calif., W. S. Hanford · Houston, Texas, The Corbett-Wallace Corp. · Seattle, Wash., National Steel Sales, Inc. · Los Angeles, Calif., Ducommun Metals & Supply Co. · Cleveland, Ohio, E. F. Bond · Boston, Mass., H. J. Linn Co. · Detroit, Mich., H. L. Sevin · Portland, Oregon, National Steel Sales, Inc. · Montreal and Toronto, Canada, Drummond, McCall & Co., Ltd.



FLANGED a DISHED HEA

WORTH STEEL COMP

Claymont, Delaw



Write for Bulletin HD 937

DUTY ELECTRIC COMPANY

IEAT TREATING FURNACES HEVER BUTTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN



WHERE Strengt COMES FIRST.

WORK

Here is the base plate, or turntable, of a heavyduty power shovel - a single steel casting weighing a ton and a half.

STEEL CASTINGS

The steel casting met every operating requirement in the finished shovel - high tensile strength, proper weight distribution without excess metal, ample hardness, rigidity, and resistance to shock, fatigue and vibration.

For the manufacturer, the steel casting saved money, because it required less machining and assembly time, no extra annealing or normalizing, minimum stock allowance for finishing and a smaller number of parts to handle. Although the casting itself is intricate, it required no revision of design for the foundryman.

Your market — everyone's market — demands a better product at lower cost. Steel Castings, large and small, will help you deliver it. Consult your local foundry, or write to Steel Founders' Society, 920 Midland Bldg., Cleveland.

A Prominent Shovel Manufacturer says of Steel Castings...

"Superior physical properties, extra strength and hardness, better shock resistance, more economical, metal used to better advantage for strength and weight, less vibration, less gear noises."

> - Quoted directly from this manufacturer's letter.

IMPROVE YOUR PRODUCT WITH

STEEL CASTING



Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Swings Back

or:

ly close and much interrver of trends in labor m pleased at the evident ying of the pendulum to rmal position in the atws and government. For past radical labor ideas in the ascendency, to detriment of employers arge portion of workers. has been given for or-to coerce workers by s to join organizations neir administration, have cally rackets, living off collected from members force. Picketing to colproof of this statement. e past few months the anity has been apparent. ates have passed laws ny of the former prac-l. The sit-down strike utlawed in spite of its port by government of-east by their inaction. Then is on the way to

nent is on the way to Wagner act to allow emal rights with labor or-This will give workers plance of freedom in gents for collective bar-

ge in sentiment is an insult of the high-handed of the past few years, the time certain organizaridden roughshod over all rights. The tendency dese conditions seems to force.

a whole will be the n the change in sentikers will be freed from domination of organizers lust of political power for funds arising from Better relations between employer and employe will result.

The change in sentiment augurs a better appreciation by the public of the labor situation, an understanding of the results of coercion and the rights of the worker to be employed without permission of an outside agency.

CHARLES H. DAVIS

Philadelphia

Steel Always Modern

To the Editor:

Modernization of plant by the steel industry is reflected in the report of the American Iron and Steel institute (STEEL, June 5, p. 80), giving statistics of plants abandoned or dismantled since 1926 and new plants built to keep pace with demand.

Much comment has been made in recent months as to lack of ability of many branches of the metal-working industry to keep plant equipment up to the level of efficiency. A high percentage of machinery is said to be outmoded and inefficient in comparison with modern devices.

In the production of steel this is not so, as the institute report shows. Every effort has been made to incorporate the most efficient processes, and obsolete plants have been replaced by rolling mills and other equipment to give the best possible product. This has been necessary, to provide products suited to modern manufacturing methods.

An interesting sidelight is found in the statement that the more efficient mills require more workers than their predecessors. The explanation of this probably is the higher quality of products, requiring more processing.

Steel executives have shown much foresight in adopting ad-

vanced methods, not hesitating to abandon old equipment when newer plants offer better steel at lower cost, providing material for manufacturing better products.

FARRICATOR

New York

Old Hands Have Value

To the Editor:

Good understanding between workers and employers must exist in a great many institutions in Cleveland when 700 workers have been employed 40 years or more in the same place (STEEL, June 5, p. 21). No better evidence is needed. And the one worker with 61 years for the same employer really sets some kind of a record. In an adjoining column is recounted presentation of a plaque to a Revere Copper & Brass employe of 50 years.

These must be good employers and these workmen must have been efficient to continue the mutual relation so many years. Another thought comes up in this connection, that men are not being discharged at 40 or 50 years on account of age. Instead they seem to be held for their experience and they are valued in proportion to their service.

These records have been made through the past decade when unemployment has been heavy and employers could have replaced these employes by younger men, perhaps at lower wages. Facts like these coming to public notice indicate a high level of employe relationship and doubtless could be duplicated in every city in the land. These men are the backbone of any working force and industry is the stronger for their presence.

WILLIAM JOHNSON

Cleveland

TO MEET INDUSTRY'S DEMANDS FOR ECONOMIC HIGH ILLUMINATION LEVELS... THE COOPER HEW



100-watt fluorescent lamp



"Better Than Daylight" engineered with Cooper Hewitt Mercury Vapor Lamps—Cooper Hewitt Fluorescent Lamps

GENERAL SEEECTRIC VAPOR LAMP COMPANY

ONSUMING only 100 watts, this lamp has an output of 5,000 lumens-the greatest output of any lamp of equal wattage now on the market. It provides a cool blue-white light, blending well with daylight. Details are easily seen. It is psychologically cool and actually cool from a physical standpoint thus decreasing the air-conditioning load. » » » Industrial plants of every kind will find it the answer to better employee welfare and better production which inevitably follows when lighting levels are raised and engineered to produce non-fatiguing illumination. Write for a copy of the new bulletin describing Cooper Hewitt Fluorescent Lamps. General Electric Vapor Lamp Company, 885 Adams Street, Hoboken, New Jersey.

TORIAL STAFF

E. L. SHANER
Editor-in-Chief
. C. KREUTZBERG

Editor
A. J. HAIN
Managing Editor

E. F. Ross
ngineering Editor
Guy Hubbard
schine Tool Editor

D. S. CADOT Art Editor

OCIATE EDITORS

VE J. D. KNOX G. W. BIRDSALL W. J. CAMPBELL

New York

B. K. PRICE

L. E. Browne
gh Chicago
rford J. F. Powe

J. F. Powell

Washington
L. M. LAMM

London INCENT DELPORT

SINESS STAFF

G. O. Hays usiness Manager

C. H. BAILEY Ivertising Service

E. W. KREUTZBERG
B. C. SNELL
S. H. JASPER
L. C. PELOTT
R. C. JAENKE
D. C. KIEFER

J. W. Zuber

AAIN OFFICE

Building, Cleveland

ANCH OFFICES

Peoples Gas Building
1800 Koppers Building
1800 Koppers Building
1010 Stephenson Building
National Press Building
282 Sinton Hotel
1100 Norwood Ave.
Calij., Tel. Glencourt 7559
Caxton House
Westminster, S.W. I

Che Penton Publishing Co., g, Cleveland, Ohio. John A. man of Board; E. L. Shaner, Treasurer; J. R. Dawley and e Presidents; F. G. Steinebach,

Bureau of Circulations; Asso-Papers Inc., and National Pubion.

Monday. Subscription in the Cubs, Mexico and Canada, one cars \$6; European and foreign car \$10. Single copies (current

nd class matter at the postoffice nder the Act of March 3, 1879. by the Penton Publishing Co.



.9

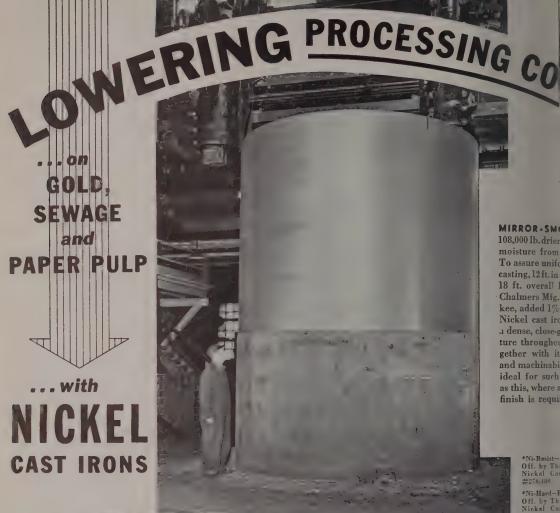


Volume 104—No. 24

June 12, 1939

19

READER COMMENTS	7
AS THE EDITOR VIEWS THE NEWS	
NEWS	
Steel Industry Spends Billion for Modernization 2:	3
How To Put More Machines at Work Is Problem	6
Electrical, Aviation Industries Seen Growing Markets for Machines 27	•
Activities of Steel Users and Makers	
Financial News of Steel Industry 200 Steel Imports Up 68 Per Cent 300	
Steel Imports Up 68 Per Cent 30 Farm Equipment Exports Higher 30	
Steelworks Operations for Week	
Men of Industry	
Obituaries 3	
New Ships Take 70,000 Tons Steel	
Aviation 3	7
WINDOWS OF WASHINGTON 3.	4
MIRRORS OF MOTORDOM	9
EDITORIAL—Reciprocal Buying Cuts Both Ways 4	
THE BUSINESS TREND	
Activity Index Reflects Holiday Interruption 4	3
Charts and Statistics	5
TECHNICAL	
Appearance Gains Recognition in Machine Tool Marketing 4	
Midget Gasoline Engines	
Constructing Low-Cost Streamlined Steel Houses in California 6.	м
European Automotive Experts See Detroit Factories; Hear Papers 79	0
JOINING AND WELDING	~
Welding Galvanized Sheet 5	0
MATERIALS HANDLING	
Pallets and Trucks	2
PROGRESS IN STEELMAKING Flectrotinning Strip Steel	6
Ziedrotining	U
METALS AND ALLOYS Silver Added to 18-8	Q
	O
HEAT TREATING Tags and Dies	6
Taps and Dies	V
FORGING Forging Flanges 7	0
Forging Flanges 7	
INDUSTRIAL EQUIPMENT	
MARKET REPORTS AND PRICES	~
The market week the search and the s	
BEHIND THE SCENES 9	
CONSTRUCTION AND ENTERPRISE10	1
INDEX TO ADVERTISERS 10	Ö



GOLD MINE "IN THE BLACK."

Even in gold mines, operating costs must be kept down. Ball mill liner costs were halved when the Wendigo mine in Kenora, Ontario, used Ni-Hard,* an exceptionally hard and wear resistant Nickel cast iron, for liners in their ore grinding mill. These liners, cast by the Vulcan Iron Works, Winnipeg, handled

more than twice the tor by previous liners of material. Reduce proby specifying Nickel hard jobs in your plical information aborting applications of Materials in your inwrite to the address by



LASTS 10 TIMES LONGER.

In one service test, Ni-Resist,* the special corrosion-resistant Nickel cast iron, withstood acids and organic compounds encountered in raw sewage 10 times longer than plain iron. To cut processing costs in modern sewage disposal plants, this

Comminutor grinder shell is cast from Ni-Resist for the Chicago Pump Co. These precision castings, which withstand abrasive wear stoutly as they do corrosion, were produced by the Challenge Foundry Co., Batavia, Illinois.



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YOR

TEEL

PRODUCTION · PROCESSING · DISTRIBUTION · USE

the Editor ws the News

demand is moderately better in some dind releases against orders for flat-rolled re increasing. Production last week again (p. 31) to 53.5 per cent of ingot capacity. further gains are not likely to be impresicularly because consumption by the autojustry (p. 83) is to be light over the next Termination of the Briggs strike tempoooths the Detroit labor situation; there is a of union demands on automotive comn the meantime tool and die work for 1940 is been resumed. Prices in some instances entirely firm; plate quotations are being d official levels on sheets have not yet been ablished. Scrap prices are up slightly.

sentiment grows that, in the absence of ect revision at this session, the resolution to te the national labor relations board should

be passed. The American Iron and Steel institute, through its executive secretary, Walter S. Tower, last week (p. 34) presented recommendations for a number of

in the act. The President has signed the orizing expenditure of \$100,000,000 over a riod for the purchase of strategic materials is country must obtain largely from abroad; l appropriation, however (p. 36), yet has de. . . . Our exports of aeronautical prodinue to gain, with Great Britain and France customers; Germany and Italy (p. 37) are n South America.

nization and improvement in the steel inill continue, but along different lines, as a the industry's current financial condition.

Emphasis now is on low-cost mills with lower speeds and lower overhead charges than the high-speed continuous mills that have been built in recent years. Research being intensified in various directions. The process seems likely to gain wider adoption. e some conclusions by Robert L. Hartford,

STEEL'S Pittsburgh editor, as to economic trends in the steel industry. . . . Republic Steel Corp. (p. 31) will rebuild and enlarge its blast furnace at Warren, O. . . . Important changes are to be made by the American Society for Testing Materials (p. 54) in the publication of its standards.

A pioneer researcher in continuous electrotinning of wide strip steel believes that this development now is ready for application to large-scale, commercial

Continuous Tinning

production (p. 56) of high-grade tin plate. . . . Appearance is gaining as a key factor in machine tool marketing, according STEEL'S machine tool editor, Guy

Hubbard (p. 46). The machine tool industry can sell most effectively on the basis of "profit engineering." it was stated (p. 27) at the spring convention of the Associated Machine Tool Dealers of America. . . . A 1/4-horsepower gasoline engine is used to drive model airplanes and boats; it weighs 3% ounces (p. 48) and has speeds from 1000 to 8000 revolutions per minute. . . . Gage blocks now have chromium plated surfaces (p. 62), with resulting longer life.

Fusion welding of galvanized material need not cause increased corrosion if properly done; certain factors must be observed (p. 50) if a satisfactory

Fusion Welding

job is to be obtained. . . . Many possible materials handling improvements are ignored due to erroneous impressions that the resulting savings would be negligible.

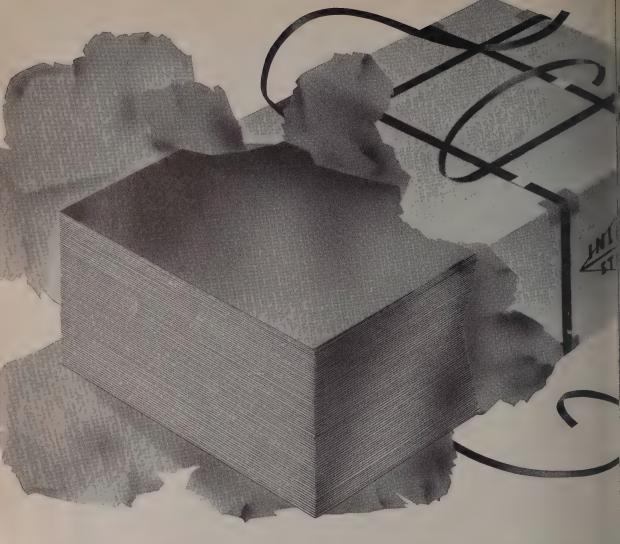
In one such case (p. 52), involving motor brush assemblies and miscellaneous items, good results were obtained from use of fork trucks and pallets. . . . Addition of a small amount of silver makes chromiumnickel stainless steel more resistant to sea water pitting and (p. 58) reduces work hardening, improves machinability, thermal conductivity and polishing characteristics. . . . Steel is consumed in unusual quantities in a new type house (p. 64) in California.

EC Krentsberg

nized

ts

Case



Even Steel Should "Kept Fresh"

It is one thing to make good sheet steel—another to see that it reaches the customer absolutely "fresh"—clean, unmarred, ready for use. Inland does both.

Inland's packing and loading methods are the result of specialized study and long experience. Careful wrapping in moisture-proof paper, and steel wrapping under tension provide the maximum resistance to corrosion and scratching caused by internal movement.

Car loading gets special attention, too. Each package is

a floating unit which does not contact others, n and sides of the car.

The best feature of this method is—it works. of the service Inland gives every customer which applies to each shipment of steel, large

Inland methods of sheet protection are typical used not only in making, but shipping every Product.

When you need a thoroughly careful steel ser kind—call the nearest Inland office.

INLAND STEEL C

38 South Dearborn Street, CHICAGO . District Offices: DETROIT . KANSAS CITY . MILWAUKEE . ST. LOUIS

Steel Spends Billion for MOCOUNTS of the Net Earnings Under That Amount

Capacity Far Ahead of Requirements, Yet Technical Progress Spurs Improvement—New Trends Sighted if Financial Resources Continue To Decline

> By R. L. HARTFORD Pittsburgh Editor, STEEL

IICAL progress and the esituation have been far brant factors in determinand how money should be expansion and modernizate steel industry than busitions. Experience shows fact business is not particle does not hold up new ruction. Of course, a pedreme depression such as ed in 1932-33 necessitates and for several reasons, east of which is the fact scarce for financing major tents.

slightly different trend is Cechnological factors still important in determining by the industry will turn, ecoming even more important, the industry's abilized, though still good, has in recent years and this financial conditions has evelopments along a new

ce at the figures showing industry's large building demonstrates why the oddy industry" cannot be Production facilities canowed to run down, because mendously high rate of obe due to constant technologress.

n scrapped because their is no longer capable of

steelmaking; rather they lose out because the equipment cannot keep up with mills embodying new technical developments. Their "seven-league boots" are decrepit compared with the 70-league models just installed in the new mill across the way.

This progress has not been confined to those parts of the industry where new processes have outmoded the old. Production equipment in many processes has undergone little radical change, yet there has been a constant flow of refinement and reconstruction here, too. For example, in the open hearth itself the theory of steelmaking has not changed fundamentally, but new devices have brought closer controls; new refractories, more even temperatures; new heating methods, greater fuel economy. This changing picture has resulted in a constant stream of new open-hearth construction.

Product Uses Expanded

Another important reason why the industry cannot let production facilities grow old is the fact that not only do these technological changes make production more economical, but they improve the product's quality to such a degree that many new uses have been developed.

To keep in the picture and to profit from new uses, the steelmaker must install equipment to produce the required product. A prime example of this is the increasing use of



steel in automobile bodies as result of improved deep drawing qualities of sheets

Considerable of the money spent for new equipment and modernization has gone into better research facilities. Within the past year, despite the recession, two major steel companies have completed extensive new research facilities, and a third has an elaborate program under way. Such laboratories are constantly bringing refinements and improvements in existing products, as well as developing new products to fit customers' needs.

Table I shows the number of new rolling mills completed each year for the past 20 years. Although the outline of the depression may be noted in the figures, it also is obvious that in the past few years construction has rebounded to near the 1928 level, with the added factor that modern mills surpass those of 1928 in capacity and in quality of product.

Although 1938 was one of the industry's poorest years, and so far 1939 earnings are relatively low, there has been considerable volume of building. At the first of this year 13 mills were under construction for five companies, while plans for new work have since

been announced by several more units. Total bill for the year on projects already announced is estimated at \$126,000,000.

In the years 1934-1939 the bill for modernization—including new construction and equipment—amounts to \$1,000,000,000. For the years 1934-1938, inclusive, net earnings of the industry totaled about \$409,000,000.

These figures show beyond question the industry is not being "milked" at the expense of production facilities. Modernization and improvement of both products and competitive position come before dividends.

Also, there is no question but that the margin of cash available for modernization is growing smaller and it is becoming more difficult each year to finance improvements. This is due to two factors: Continuation of depression levels in the industry, and federal tax laws which make it difficult to accumulate surpluses in good times.

A few balance sheet ratios will show how the relative financial position of the industry has been declining. Normally these ratios would climb with increases in business, but an analysis of the figures for 12 major steel companies for the years 1934-1937, inclusive, when the trend was continually upward, shows the "current ratio" has declined in each year. This means current assets, including cash, securities, receivables and inventories, have lost in relative position to current liabilities, which include wages, taxes and short term notes. From the excellent position of 6.66:1 in 1934, the current ratio declined to 4.19:1 in

Latter ratio, of course, indicates the industry is far from a poor financial position, but on the other hand, although operations moved up steadily during that period, it is in a much less satisfactory position than in 1934, immediately following several years of declining business. Lowest ratio among the major companies at the close of 1937 was 2.66:1.

Long-Term Debt Growing

Long-term debt has increased 30 per cent with regard to fixed assets over the same period. In 1934, bonds, mortgages, and other long term obligations amounted to 19 per cent of the fixed assets. By 1937 this had climbed to 24 per cent.

Ratio between net worth and total debt indicates to what extent the stockholders' equity is liable to the claims of creditors. Combined figures for the 12 companies reveal the stockholders' position was weakened from 1934 to 1937, although the latter year reversed the trend. The ratio showed \$4.89 net worth to every dollar of debt in 1934; 4.11

to 1 in 1935; 3.32 to 1 in 1936; and 3.50 to 1 in 1937.

These ratios show that while the industry still is in fairly good financial position, the trend is downward and under the present surtax system, even in good times it will be difficult for the individual corporation to set aside enough surplus to carry on the continual modernization which is so vital.

. It is, therefore, becoming an increasingly weighty problem for steel management to decide matters of expansion. Financial avenues still are open and expansion and modernization continue at a fairly good rate. Present indications, however, are that future work will be along different lines. Growing pains accompanying introduction of the continuous mill are about over. Where, then, will the industry move next?

Rolling Mills Completed

	TAB	LE I	
1919	50	1929	 . 97
1920	 241	1930	 . 94
1921	 185	1931	 . 33
1922	 46	1932	 . 21
1923	171	1933	. 20
1924	 67	1934	 . 21
1925	93	1935	 . 39
1926	115	1936	 . 51
1927	 57	1937	 . 55
1928	 53	1938	 . 50

Unless there are revolutionary new discoveries in the near future which will outmode today's processes, it is believed future programs will be limited to improving present facilities, with the exception of mills now being built or soon to be built in order to take advantage of the changing economic structure.

Factors causing latter type of expansion include industrial development in the South and elimination of basing point differentials. By and large, however, there is enough capacity at present to care for the country's needs under normal or even boom times.

A study of the figures discloses ingot capacity to be ample. Heaviest ingot production was in 1929, when 56,433,473 tons were poured. Current estimates of ingot capacity are based on 71,191,994 gross tons of open-hearth and bessemer steel, or about 25 per cent above the highest production to date. This condition is reflected in the decline innew open-hearth capacity in recent years as shown in table II.

Same is true of pig iron capacity, where the peak year of 1929 produced 41,757,215 tons, while current capacity is 51,401,480 tons.

In rolling mill capacity the margin is not so wide for all products, although total capacity for hot-rolled

products is 57,389,000 gr ample margin above the tal tonnage rolled, 41.00 in 1929.

However, as regards products the situation s. Rail capacity is now 2,990 tons, while in 1926, peak 3,217,649 tons were roll tural capacity is now 5,00 while the peak year professional transport of the peak

Flat-rolled steel, on hand, shows a tremendou in capacity against incrume. Heaviest tonnage in strip, for example, was 1937 with 12,828,000 gross pacity for these products up to 19,856,950 gross to per cent above peak product apacity resulting from hand for the cold-rolled p shown by the increase in years 1936-38, inclusive, cent to 1,691,600 tons cap

However, there is alway erable obsolescence and if portion of the listed actities there are mills which agement recognizes must for newer units in the new control of the second of the

The big problem now far agement is to find the cient way to replace stylescence under today's captions and without further ing financial standing, seen how the financial propersion of the progress of the pr

Studying Financial Diffi

There are several lines of along which the industry gressing. The first is to on the enormous expendit to obsolescence by building cost mills, thereby reducing mendous depreciation cha the large investment r Changes in the tax picture as the financial situation h. such a course highly desir course, something must ficed in such a condition: fice would have to be made cost of production per unit been shown in operation speed mills that cost o speed moves up in grea than actual increase of ou good part of the industry is to believe the higher cost uct on slower mills would than offset by reduction in preciation and other fixed

Probably the most conproach to the problem f angle is in the design of mihave a lower operating s one time. This would size and cost of mill cost of prime movers, the handling of mateould by the same token costs of shutdowns, and

chnologists claim imity could be obtained on by means of reheating aced at strategic internation the processing to mainel at most efficient rollatures during the entire this would be feasible ringots and billets to a ter extent than it is at the large quantities high speeds to enable rolling before the steel o cold.

process might also result or finished product and ts of pickling and chips could be applied to alfinished steel product, ineets, bar and pipe.

ele is one result of more in between the metalithe mill engineer. From rgist's point of view it is ly easier to build a mill not become obsolete in period than from an entie wpoint, because the who has in the past ded built the steel mill with m of influence from methas mainly been interesting out the largest quantel in a given time with the dient operation of his ma-

tallurgist, however, is now its influence more strongly ough there is still need r co-operation. In the fus probably will be built for trend rather than immediancy, turning out more products from a more flexiuction line.

ation of "gadgets" which he production unit is annsideration in order to resolescence.

k Operating Efficiency

ther angle which the induspproaching now more than fore is higher efficiency in ns. Probably the most sigsingle step in this direction urn back to the bessemer for steelmaking.

t wasteful heating processes. It is widely used because onvenience and ease of conwell as its ability to use efficiently as other mate-lowever, from the fuel ansone of the most expension.

essemer process, on the oth-

er hand, is one of the most efficient, but has been displaced by the open hearth because it has been difficult to control closely and scrap cannot be used to any extent.

Several major companies have appropriated considerable money for research on the bessemer process, and the trend in the open hearth-bessemer ratio may be reversed. This will be especially true if one of the several lines now being carried out toward the perfection of an efficient melting furnace for scrap is successful.

Closer control of the bessemer through the use of photoelectric cells is another line along which research has been heading, and some attempts are reported successful

A majority of the current problems on which research is now going

Open Hearths Built

TABLE II

		Added	
Year		Completed	Tonnage
1913		62	3,120,000
1914		9	507,000
1915			1,759,000
1916		105	4,300,000
1917		102	5,413,000
1918		39	2,192,500
1919		23	1,871,000
1920		26	1,268,000
1921		13	620,000
1922		7	364,000
1923	,	8	535,000
1924			1,110,000
1925		9	630,000
1926			1,327,500
1927			515,000
1928		13	1,204,500
1929		14	1,134,700
1930		16	1,427,400
1931		34	3,068,900
1932		0	0
1933		4	246,400
1934		1	25,000
1935		1	35,000
1936		8	662,800
1937		1	85,000
1938		11	931,300

forward are long-trend developments and have little or no bearing on the immediate factors confronting the industry. Among these are the ever-present direct rolling process and the various methods of by-passing the blast furnace in direct production of steel.

Uniformity of quality is dominating all research, both on immediate work and on long-term projects, and a constant study is being made of the variables in every process of steelmaking and treating, as well as in the mechanical working, in order to tie into a standard process all the possible variations which now produce differences in quality between one melt and another. As a result of this work, a wider application of close control will be seen in almost every stage of steelmak-

ing. Better instruments and more knowledge of how to use them is the immediate result.

Despite the fight against obsolescence, bottlenecks will develop if demand increases greatly. These will be largely in auxiliary equipment, such as heating devices, handling equipment, and in co-ordination of the various processes. Another question mark is the availability of labor should the mills be faced with heavy tonnage requirements. Labor troubles of 1937 are still vivid in the memories of too many steel companies to be regarded lightly, and unless there is some way to provide experienced labor there will be production troubles on this score.

Transportation Shortage Seen

Another possible difficulty is shortage of transportation facilities. Railroads are operating with minimum car requirements. Any increase in demand would require more cars. Car building programs have been deferred so long that current capacity for construction is not large enough to cope with the actual number of cars needed to insure adequate transportation facilities.

Announced building programs by the roads indicate that should all the proposed cars be placed at once, the country's car building facilities would be tied up until some time in 1940. This would be true if placements were imminent, but as these placements will probably not be entirely allotted until late this year, there is little doubt that the deliveries would not be completed until some time in the last quarter of next year. Should business improve with any alacrity, there would almost certainly be a jam in the transportation picture.

However, these bottlenecks can be and will be eliminated as they arise. The fight of steel management for efficient and profitable operations in the face of new rules laid down by labor and government can be won, and is being won, through new approaches to the problem of production. Technology has created the immediate problem of obsolescence and has caused the resentment of labor, but technology can also eliminate these problems by proper study and development of the facilities already on hand, so the various elements involved-capital, labor, management and government-can each play its respective role without being dominated or overshadowed by any of the others.

■ Battelle Memorial institute, Columbus, O., has awarded contracts for construction of a research laboratory, adding 50,000 square feet of space on five floors.

Defend Machines? It's How To Put More of Them at Work, That Counts

■ OBSTACLES which the national administration has placed in the path of business—not progress in mechanization—is holding up re-employment and employment increases. This is the opinion expressed by Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O., and president, National Machine Tool Builders' association, in replying to a letter to STEEL (April 24, p. 9) by Charles I. Faddis, Democratic congressman from the twenty-fifth district, Pennsylvania.

Congressman Faddis wrote that although machinery has brought a great many commodities within the reach of the mass of consumers, he believes we are at present supersaturated with machinery, that putting additional machines to work will not solve our problems, and that certain machinery displaces labor merely in the interest of time. Mr. Whipp's reply:

Dear Mr. Faddis:

In your letter to Steel which was published in the April 24 issue you put your finger directly upon what is without any question the foremost problem confronting the United States today. This country still has too many people unemployed. We must work out some means whereby more of the men who are capable of earning a living have jobs which will assure them of continuing employment at fair wages.

The objective toward which you are striving is exactly that toward which American industry is striving.

American industry, on the whole, is set up on the basis of mass markets. It can make profits only on the basis of large volume. To assure volume, there must be the broadest possible purchasing power. Mass purchasing power can come only from continuous and widespread payrolls.

Displacement Only Temporary

It follows that if business in this country is to make profits, the largest possible number of people must be employed on a basis which will permit them to spend a fair share of incomes on the products made by American industries.

The only difference between your viewpoint and ours has to do with the methods to be employed to reach our common objective.

According to your letter to Steel, you apparently believe that modern equipment and machinery have the effect of putting men out of work. I take the liberty of saying frankly that I disagree with you as to this premise.

It is my firm belief, based upon

practical experience, that increased mechanization leading toward increased productivity results always in the long run in increasing the number of men employed.

You assume that when a "labor saving" device is introduced in a certain industry, this device displaces a number of men who up until this time had been performing this particular job largely on a handlabor basis. That does happen. It is a matter of record that in many industries modernized equipment, which enables five men to turn out the number of products formerly produced by 20 or 25, has sometimes resulted for the time being in the displacement of men hitherto emploved.

More Machines, More Jobs

But it is also equally a matter of record that in the long run the sum total of employment is constantly increased by more efficient mechanization; and that in the very plants where men have been temporarily displaced by machines, employment levels have shortly thereafter passed all previous records, due to the production economies made possible by those very machines.

Where do you find records of really substantial employment increases in this country? You find them in the very industries which have been

the foremost in adopting provements which moder ization had to offer. As a may cite the automobilithe radio industry and thator industry.

The amount of employed counted for by these indubeen literally dependent acceptance of the primore efficient machines sible greater productivity turn leads to lower price markets and greater volumers.

Here is another illust in 1929, 419,000 people were in the steel industry. By son, 449,000 were employ steel industry during the of 1938. Why? The antichiefly in the fact that the steel industry there is a tremendous wave of retion of plant and equipment.

Of course, when continumils were installed a numen formerly employed sheet mills were displaced

But the new methods n sible a reduction in prid about \$110 per ton in 1923 \$61.00 per ton today). This in a substantial increase in the total output of all finish has increased from 3,078,14 1923 to 10,900,000 tons in 1 in 1938 a total of 7,279,465 produced. We do not know ditional employment resu side of the steel mills in cation and sale of this crease in sheet production great majority of the men to

Huge Rotary Cooler Shell for Oil Industry



This rotary cooler shell, all welded, was built recently at Allis-Chalme Co.'s Milwaukee plant. It weighs 110,000 pounds, is 8 feet in diameter feet long, to be used in a special processing plant serving the oil ind the Southwest

when continuous strip in have found employher divisions of the steel or in other occupations, um total of people emthe steel industry itself ely increased.

e story is told by the teleistry, which you particulenge in your letter to a cite the dial phone as example of mechanization contributed to unemploy-

s are these: The Ohio Bell Co., with headquarters nd, reports that in 1911 system employed 146,000 his was the year in which steps toward dial phones n. Between 1911 and the ty the installation of dial is been a constantly proproposition. Today the m has almost 300,000 em; compared to 146,000 in

ou seem to be extraordicerned about switchboard it may be of interest to low that in 1911 the com73,500 women employes the company has 161,000

conviction that mechanize basic foundation of emincreases. I believe that chinery enables the manufithis country to give the etter products at lower of these lower prices in a larger number of pocket-d thereby produce a volsiness which gives rise to aployment.

ly Lies in Washington

a matter of fact, by no large a share of the unent situation is as attributive to industry as you apassume is the case. Even
almiest days of the "New
anufacturing employment
counted for more than onethe jobs in this country.
It time our manufacturing
shave long since reablost of that share of emwhich had been theirs
e depression.

ill significance of employreases through progressive ation of our industries canappreciated until we also o consideration the correincreases in the number e employed in service in-The servicing of the produr plants employs millions. Itomobiles alone, for ex-Think of the number of ien, gasoline station attendthe like.

firmly convinced that by the economics of improved y, increased productivity,

and lower consumer costs, manufacturing industries, plus the servicing activities created thereby, will in the future account for a still larger proportion of the employment in this country than has been the case in the past.

Now you will ask—if these contentions are true, why is not this program today going ahead? What is holding up the re-employment and the employment increases which, in theory, result from increased mechanization?

The answer lies in the obstacles which the national administration has placed in the path of business—obstacles which tend to defer and postpone the long-term investments in plant, equipment, and machinery which must be made by manufacturers in order to achieve better mechanization.

I do not believe that the remedy for unemployment lies in attacking the machine, I believe we will find it in Washington.

Here is a program for reducing unemployment:

1. Balance the federal budget.

2. Revise the tax structure in such a way as to impose less severe penalties upon business.

3. Amend social security legislation in such a way as to cut the amounts paid by employers and employes but provide actual security instead of a "reserve" which exists only on paper.

4. Amend the Wagner act.

It is my suggestion that this program, if accomplished, would put millions of men back to work practically overnight.

Permit me to express my appreciation of the fact that you as a congressman have gone to the very root of our national dilemma, and are seeking to unravel from our national economic crazy-quilt some method of procedure and some economic philosophy which will lead toward larger and more stable employment and prosperity. The fact that you are thinking seriously and sincerely about this whole problem of employment and mechanization gives us renewed faith in the representative form of government under which this nation operates.

Electrical, Aviation Industries Seen Growing Markets for Machine Tools

■ A PLEA for closer co-operation between manufacturers, sellers and users of machine tools was made at the spring convention of the Associated Machine Tool Dealers of America at Hotel Van Curler, Schenectady, N. Y., June 5-6. This appeal was set forth by A. G. Bryant, president, Bryant Machinery & Engineering Co., Chicago, speaking in his capacity of president of the organization to the 120 members and guests in attendance.

Taking "From Builder to Salesman to User" as his topic and explaining this title as a paraphrase of the once-famous baseball double play "from Tinker to Evers to Chance," Mr. Bryant asserted: "If ever an industry needed close teamwork and ability to match co-operation with skill—as in the case of the old masters of baseball—it is the machine tool industry of today.

"Creation, application and resulting effects of machine tools are too closely related, for users, manufacturers and sales organizations to stand independently of one another.

"Who does the selling of machine tools? It may be surprising information that according to an analysis which our association has just completed, there probably are less than 1000 men engaged in the United States today in personally

contacting users in the promotion of sale of machine tools.

"Personality will always be important; there are no substitutes for acquaintance and business friendships. But the machine tool salesman of today and tomorrow whose record is and will be outstanding, who will make the greatest contribution to his organization, to society and to himself, is the man who applies his technical knowledge and experience with diligence."

General Electric Co., Schenectady, N. Y., was host to the Dealers' organization, greetings being extended by W. R. Burrows, vice president in charge of manufacturing. Among other speakers from this company were E. D. Spicer, works manager; R. C. Muir, vice president in charge of engineering; and B. G. Tang, general superintendent.

Need Machine Tools More

Mr. Spicer stated that with skilled labor becoming increasingly scarce and expensive, the electrical manufacturing industry today needs help of the machine tool industry as never before. Mr. Muir characterized machine tool men as perennial industrial pioneers who, more perhaps than any other industrialists, must constantly "live by their wits."

"Technical developments and so-

cial development," said Mr. Muir, "have always gone hand in hand, and with 4000 people now busily engaged in our engineering departments, it is obvious that we are striving toward even better things tomorrow than are being done today. That means we must have still further machine tool developments."

Speaking of his own experience in doing business with machine tool agents, Mr. Tang made the statemen that at one time or another his company had learned so many valuable things from these agents, especially from many who are practical shop men or engineers, that the attitude of the plant management toward them can be summed up by this invitation: "Come and go in our shops as you please—almost!"

Speakers at the banquet on June 5 were John H. Van Deventer, editor, *The Iron Age*, New York, and Dr. James S. Thomas, president of both Chrysler Institute of Technology, Detroit, and Clarkson college, Potsdam, N. Y. Mr. Van Deventer dealt primarily with present-day threats to the American system of mechanization—of which he sees as: No. 1, restriction; and No. 2, socialization.

Culture Follows Prosperity

Dr. Thomas, who at the beginning of his career confined himself to classical studies, has for many years been conducting historical researches which seem to prove that every great cultural movement has been due to a boom in industry and trade, whether in ancient Greece or Rome, in Venice, in Elizabethan England or in much more modern times.

As he put it: "Whenever the profitable trade of any country flew out the window, all the philosophers and writers and other cultural elements hastily departed through the door in search of new sponsors in more prosperous places."

Dr. Thomas believes that no country ever held for its population greater cultural opportunities than does the United States today—if only our people will build on their solid industrial foundation by devoting at least a part of their free time to cultivating really worthwhile things in life.

Under the title, "Assisting in Machine Tool Sales," J. E. N. Hume, commercial vice president, industrial department, General Electric, stressed the fact that for ten years his company has been co-operating with the machine tool industry through advertising campaigns directed at machine tool users.

Ever since President Cleveland's administration, said Mr. Hume, the

electrical industry has recognized the machine tool industry as a growing market. At the same time the machine tool industry has become more and more important to the electrical industry through its help on production problems until, "like the chicken and the egg," it is difficult to say which one is more important.

P. W. Brown, general superintendent, Wright Aeronautical Corp., Paterson, N. J., gave a glimpse of new horizons when he said: "The aviation industry is growing by leaps and bounds, none is more exacting and in connection with it machine tool builders have their big job yet to do."

Presents New Problems

While 5000 engines per year still is big production in this business, it many characteristics of giving a glorified job shop, certain parts such as cylinders, pistons and connecting rods, which are used in multiple, do already run into mass production quantities, Mr. Brown said. Work which must be held within 2 micro-inch profilometer readings as far as surface finish is concerned naturally does present problems to the machine tool industry, but when \$1,000,000 per year machine tool programs are involved, these problems certainly are worth thinking about.

Among the guests present at the convention were a number of men prominent in the machine tool building industry. These included Wendell E. Whipp, president, Monarch Machine Tool Co., Sidney, O., who also is president of the National

Machine Tool Builders' assigned and Tell Berna, general many that association, Clevelan Berna spoke on the subject operation between builded dealers to obtain more marketing to meet present ditions.

All "Profit Engineers

Mr. Whipp addressed the eon meeting on June 6 on ject of "Profit Selling." He country is full of peoneed the latest machine who either don't know it care, simply because the possibilities of these machines properly been presented to machine tool salesmen.

"Let's get away from talk about fine castings, shafts, etc., except as the directly contribute profit user," he said. "We are a engineers' now. If we foll plan consistently, the buy harks back to the old 'p pound' formula will at last' extinct."

A number of inspection to made, the Watervliet arse the American Locomotive C visited on Monday afterno General Electric Tuesday af Much favorable comment won the department at W which is devoted primarily ducing anti-aircraft guns, amount of new machine to ment recently has been in this part of the arsenal value is clearly reflected tude of workmen and in quaoutput of work.

Ship Girders 140 Feet Long, 15½ Feet Hig



■ Steel girders 139 feet, 10 inches long, 15½ feet high in center and 3 ends, weighing an average of 60 tons were shipped recently from Bethlet Co.'s Pottstown, Pa., plant to Pennsylvania avenue bridge project in War Each shipment comprised four girders on three cars. They were lon heaviest loads ever transported by Pennsylvania railroad

ities of Steel Makers

T. RYERSON & SON ago, has purchased its a plant property at 5200 enue, heretofore leased or-Wharton Iron & Steel asive improvements and re under way which will arge the scope of its serv-Philadelphia market.

ir ital Roll & Steel Foundry hicago, Ind., has acquired gineering Co., St. Charles, will be made a unit of its equipment division. It facture welded tube mill including automatic bufolishing equipment, under er patents. Engineering, d sales staffs have been by the Continental com-W. Faint has been placed of sales of buffing and equipment for the new

Ilt Co., Chicago, announces coadening its line of modr transmission equipment, n appointed distributor for se friction clutches and uplings by the Twin Disc o., Racine, Wis.

an Screw Co., Providence, ensor for the Phillips-type head screws and bolts, is ng its Detroit offices June 010 Stephenson building to uarters at 1847 Bethune est, where lease has been the two-story building occupied by Monarch Gov-

nd district offices of the r Products Co., Carbide & hemicals Corp., and Haynes o., all units of Union Car-Carbon Corp., New York, n moved to 1517 Superior District managers are H. Linde Air Products; E. E. rbide & Carbon, and F. P. , Haynes Stellite.

Connersville Blower Corp., ille, Ind., has appointed owing representatives to ales of its turbine pumps: California Engineering South Western avenue, Los Colby Equipment Co., 241 street, Indianapolis; Lewis n, 1304 McGee street, Kan-Mo.; J. H. and E. C. Rose-2 Crosby building, Buffalo; Equipment Co., Erie, Pa.; Shepherd Co., Richmond, orge F. Gilfrin, Apartado 63 xico, D. F. Exclusive jobbing arrangements have also been made with John E. Larrabee Co., Amsterdam, N. Y.; R. B. Wing & Son, Albany, N. Y.: Ellis W. Morse Co., Binghamton, N. Y.; Cameron & Barkley Co., Tampa, Fla.; Sanford Machine Co., Sanford, Fla.; Rural Electric & Supply Co., Spokane, Wash.; John Strumquist, Albuquerque, N. Mex.; Mora-Ona Co., Havana, Cuba.

FINANCIAL.

BETHLEHEM FILES MORTGAGE BOND ISSUE

BETHLEHEM STEEL CORP. has filed with SEC a registration statement covering issuance of \$25,000,-000 consolidated mortgage 20-year 31/4 per cent bonds, series F. The consolidated mortgage is now a first mortgage on most of Bethlehem properties. Purpose of the new issue is to replace working capital used, or to be used, in the retirement of the first lien and refunding mortgage bonds of the Bethlehem Steel Co. and the first consolidated mortgage bonds of Lackawanna Steel Co. The new issue will be offered on or about June 17, by a group of underwriters.

APPROVE CHANGE IN CLIFFS CORP. COMMON STOCK

Stockholders of Cliffs Corp., Cleveland, at a special meeting voted to change the common stock from no-par to a par value of \$5 per share. This adjustment reduces stated capital from slightly over \$24,000,000 to approximately \$4,000,000, and results in transfer to capital surplus of the difference between these two sums or about \$20,000,000.

DIVIDENDS DECLARED

Arthur G. McKee & Co., Cleveland, regular quarterly of 25 cents and an extra of 75 cents on capital stock, payable July 1 to record June 20. This will make a total of \$3 paid this year, while in the full year 1938, dividends aggregated \$4 a share. Dollar volume of contracts booked in the first five months were approximately 80 per cent greater than in the corresponding 1938 period. Close to 52 per cent of the total bookings were from foreign sources.

Interlake Steamship Co., Cleveland, 25 cents on common, payable July 1 to record June 12. Paid same amount April 1.

Bliss & Laughlin Inc., Harvey, Ill.,

25 cents on common, payable June 30 to record June 19. Similar payment was made in March.

National Steel Corp., Pittsburgh, 40 cents on capital stock, payable June 30 to record June 20. Like amount paid in preceding quarter.

Wheeling Steel Corp., Wheeling,

W. Va., 50 cents on \$5 prior preferred, payable July 1. amount paid April 1.

New Officers for Blast Furnace, Coke Group

■ G. W. Hewitt, production manager, blast furnace and coke works, Wheeling Steel Corp., Wheeling, W. Va., was elected president of the Eastern States Blast Furnace and Coke Oven association at the organization's annual spring meeting at Pittsburgh Field club, Pittsburgh,

H. W. Seyler, assistant general aperintendent, by-product coke superintendent, plant, Clairton works, Carnegie-Illinois Steel Corp., Clairton, Pa., was chosen vice president, and W. A. Steele, superintendent of blast furnaces, Crucible Steel Co. of America, Midland, Pa., secretarytreasurer.

The program consisted of informal technical discussions by the blast furnace and coke oven groups in the morning; the eighth golf competition for the Cleveland cup in the afternoon; and a dinner and business session in the evening.

F. D. Schreiber, assistant general superintendent, Pittsburgh Coke & Iron Co., Neville Island, Pa., presented to the coke oven group a paper on "Some Ideas on the Recovery of By-products." This was followed by a roundtable discussion on coke plant practices. The blast furnace group devoted its time to consideration of hearth, bosh and cast house design and furnace prac-

The golf cup was won by C. H. Pegg, superintendent of coke ovens, Pittsburgh Coke & Iron Co., Neville Island, Pa.

Builders of Industrial Furnaces Plan Meeting

■ Industrial Furnace Manufacturers' association will conduct its ninth annual meeting at Briarcliff lodge, Briarcliff Manor, N. Y., June 19-20. Program will include a business session, golf tournament and dinner on the first day; a business session on the second at which new officers will be elected. Effort will be made to formulate a uniform metal products program and consideration will be given to a set of tentative trade practice rules.

The association is composed of companies manufacturing industrial furnaces, ovens, accessories and allied equipment for heating, melting, making, refining, heat treating or processing metals and other mate-Stewart N. Clarkson, 420 Lexington avenue, New York, is ex-

Steel Imports Up 68 Per Cent

■ APRIL iron and steel imports, excluding scrap, increased 68 per cent in volume over March, amounting to 41,314 gross tons valued at \$2,703,290, compared with 24,589 tons valued at \$1,478,663, according to the metals and minerals division, department of commerce. In April, 1938, imports were 21,225 tons valued at \$1,140,875.

Germany was the chief source of April imports, 20,191 tons including

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	19	39	1938		
	Exports		Exports	Imports	
Jan.	362,672	27,664	586,294	29,631	
Feb.	359,690	19,149	460,640	19,589	
March	474,360	25,369	526,883	11,827	
April	394,008	44,083	489,202	21,237	
May			540,639	20,814	
June			312,021	15,887	
July			263,699	14,728	
Aug.			242,139	20,041	
Sept.			346,068	27,958	
Oct.			425,431	26,445	
Nov.			469,596	27,627	
Dec.			490,095	28,767	
Total			5,152,707	264,551	

14,369 tons of miscellaneous pipe. Belgium was second with a total of 7945 tons. Canada supplied 1776 tons of spiegeleisen and 1322 tons of rails and track material.

Scrap imports were also higher in April, at 2769 tons valued at \$29,366, compared with 780 tons valued at \$11,927 in March. Only 12 tons valued at \$385 were imported in April, 1938. Canada was the main supplier, 2660 tons, with Sweden contributing 103 tons, Belgium 5 tons and the Netherlands Indies 1 ton.

ORIGIN OF APRIL IMPORTS

	CHIUSS	TOHS		
			Man-	Ferro-
	Iron	Pig	ganese	man-
	ore	iron	ore	ganese
Norway	. 20,444			1.125
United Kingdon				.,
Canada		178	12	
Cuba			3,063	
	.120,100			
Iran				
British India.		3,234	2,098	
Brazil		100		
Soviet Russia.			580	
Gold Coast			3,833	
France				63
Netherlands				89
Czechoslovakia.				102
Poland				528
Jugoslavia				91
Total .	.162,113	3,512	9,586	1,998
	Sheets,	Struc-		Hoops
	skelp and	tural	Steel	and
	sawplate	steel	bars	bands
Belgium	. 129	3,950	962	1.073
France		1,771	521	300
Germany		152	161	
Sweden				174
United Kingdon			115	2
Omteu Kinguon	n		36	
Total	. 325	5,873	1,795	1,549

U. S. IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons April Apr.'39 Articles 8,359 Pig iron ... Sponge iron 3,512 3,658 151 3,307 sponge from
Ferromanganese (1)
Spiegeleisen
Ferrochrome (2)
Ferrosilicon (3)
Other ferroalloys (4)
Steel ingots, blooms
Billets 2,176 34 125 6,963 73 40 Hollow bar, drill steel Bars, solid or hollow. Iron slabs 372 6,954 229 3,366 41 638 Iron bars
Wire rods
Boiler and other plate
Sheets, skelp, saw pl.
Die blocks or blanks.
Tin plate, taggers' tin
and terne plate.
Structural shapes
Sashes and frames.
Sheet piling
Rails and fastenings.
Cast iron pipe & figs.
Malleable iron pipe figs.
Weided pipe 821 816 15 5,873 15.684 3.965 462 2,166 275 20 2,953 Welded pipe 1,652 14,467 23,482 Barbed wire
R'nd iron & steel wire
Teleg. and teleph. wire
Flat wire & steel strips 1,815 139 264 296 Wire rope and strand Other wire 126 155 779 18 Nails, tacks, staples. Bolts, nuts and rivets Horse and mule shoes Castings and forgings

(1) Manganese content;(2) chrome content;(3) silicon content;(4) alloy content.

GRAND TOTAL

41,314 2,769 107,970

44,083 25,369 116,265

April Machinery Exports Show 4 Per Cent Gain

April industrial machinery exports were valued at \$24,592,486, 4 per cent increase over \$23,672,566 in April, 1938, according to the machinery division, department of commerce. Power-driven metalworking machinery exports, valued at \$8,854,755, were below the record volume of March but 13 per cent above those of April, 1938. All major classes showed increases except power generating and construction and conveying equipment, which declined, 38 and 16 per cent, respectively, compared with April last year.

Heavy shipments of rolling mill machinery provided the largest factor in power-driven metalworking machinery increase, \$1,476,816 compared with \$304,369.

■ Italy has issued four coins in a steel alloy, "acmonital," in 20 and 50 centesimi and one and two lira denominations. The alloy name is derived from acciaio monetale Italiano (steel money of Italy). Coins of similar value issued in 1936 were of nickel. Use of steel, it is said, will release considerable nickel for other purposes, particularly munition manufacture.

Farm Equipme Exports High

■ AMERICAN farm implemachinery exports in 193 at \$75,442,000, were distributed for the first of the first of the first of the first of the machinery department of commerce, sales were increased or watained in most countries, the being reduced by sharp before major markets, not tralia, the United Kingdom Mexico and Uruguay.

Canada and Argentinusually rank first and s-1938 took 27 and 19 per catal exports in this class.

Exports to Oceanic courses to dealer \$9,548,000, a in per cent from \$12,524,000 Smaller shipments of traceparts to Australia account most of this loss. New Zea other large purchaser in vision, increased its order these countries in recent years to bought more than in 1929.

More than half the ship. Africa in 1937 and 1938 the Union of South Africa best customer for America machinery.

European markets last a chased farm machinery to of \$11,766,000, representing cent of the total, compared 432,000 in 1937.

Germany and the United are principal competitors of can implements in world the former through barted ments for raw materials.

Comparisons are found ir lowing table:

	1938
Canada	\$20,665,000
South America	19,602,000
Africa	8,660,000
Australia	6,292,000
United Kingdom.	3,946,000
New Zealand	3,228,600
Central America.	2,853,600
Asia	2,341,000
Sweden	2,283,000
France	1,386,000
Portugal	701,000
Italy	603,000
Netherlands	436,000
Rumania	431,000
Finland	400,000
Germany	317,000

April exports of farm impand machinery were value 067,114, a decline of 17 from \$8,512,988 in April, 19 five major groups showed from 7 per cent in tractors at 63 per cent in seed set Tractors and parts, constitute per cent of the total, reprevalue of \$5,512,495, compat \$5,920,282 in April, 1938.

Ingot Rate st This Year

EARTH and bessemer output in May totaled 2,ss tons, according to the Iron and Steel institute. 9,109 tons, or 2.3 per cent, 2,986,985 tons made in 162 per cent larger than 1,s produced in May, 1938. the industry operated at of 48.24 per cent of cavest rate this year, com-1 50.99 per cent in April er cent in May, 1938.

average production was s, about 5 per cent below everage of 696,267 tons. In weekly average was 406,-

months this year produc-ed 15,499,546 tons, com-9.155.740 tons for the cormonths in 1938.

a an Output Gains

's production of steel inaings and pig iron in April r than in March but below April, 1938. Four months' s less than that of the corndg period a year ago. Com m follow:

G	ross Tons	3	
S	teel ingots		Ferro-
	castings	iron	alloys
	99,752	46,254	4,284
9	95,697	40,723	3,526
	116,445	65,644	8,686
1939	350,826	185,970	15,964
1938	446.481	268.181	22,650

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

eı	veek nded ne 10	Change	Sar we 1938	ek
Pittsburgh	43	+ 1	19.3	92
Chicago	52.5	- 1	22	63
Eastern Pa	37	None	25.5	64.5
Youngstown	51	+ 3	25	30
Wheeling	73	+ 3	38	95
Cleveland	53	None	31	46
Buffalo	44	None	23	89
Birmingham	67	+ 7	58	83
New England.	40	+ 5	25	45
Cincinnati	68	+ 8	16	93
St. Louis	47	+ 9.5	39.3	85
Detroit	57	None	18	95
Average	— 53.5	+ 1.5	25.5	74

Republic To Rebuild Warren Blast Furnace

Republic Steel Corp. will rebuild the blast furnace at its Warren, O., plant, enlarging capacity to 1000 tons or more per day. Originally known as the Trumbull Cliffs furnace, it was built in 1921, slightly enlarged in 1931.

Bosh diameter will be increased from 28 feet 6 inches to 30 feet; stockline diameter from 19 feet to 19 feet 6 inches; height from center tuyeres to top ring from 84 feet to 98 feet 7 inches.

Commercial steel castings booked in April totaled 34,100 net tons, compared with 41,367 tons in March, census bureau reports. Four months' bookings were 147,851 tons, against 110.115 in the period last year.

Steel Ingot Statistics

Monthly Droduction All Companies

		Hearth-		semer	To	tal	produc-	Number
		Per cent		Per cent		Per cent	tion, all	of weeks
ı	Gross	of	Gross	of		of	companies,	
	tons		tons				gross tons	
	orted by Comp	anies whi	ch in 1938	made 97.31	1% of Open-	Hearth an	d 99.90% of	Bessemer.
-	3,069,011 2,785,629 3,201,132 2,781,008 2,747,550	55.73 56.02 58.13 52.15 49.89	147,642 196,382 194,889 205.977 170,326	27.26 40.16 35.99 39.28 31.45	3,216,653 2,982,011 3,396,021 2,986,985 2,917,876	54.60 56.14 50.99	726,107 745,503 766,596 696,267 658,663	4.43 4.00 4.43 4.29 4.43
-	14,584,330	54.36	915,216	34.69	15,499,546	52.60	718,143	21.58
	rted by Compa	nies which	h in 1938 p	nade 98.67	% of Open-	Hearth an	d 99.90% of	Bessemer.
	1,634,224 1,572,009 1,846,517 1,786,942 1,669,455	30.28 32.26 34.21 34.19 30.93	99,941 125,443 157,687 132,100 131,422	18,27 25,39 28,82 24,93 24,02	1,734,165 1,697,452 2,004,204 1,919,042 1,800,877	33.72	391,459 424,363 452,416 447,329 406,519	4.43 4.00 4.43 4.29 4.43
-	8,509,147		646,593		9,155,740		424,269	21.58
describe gelden	1,513,715 1,846,319 2,340,363 2,440,192 2,882,827 3,357,167 2,971,834 25,861,564	28.96 34.29 43.36 46.80 53.41 64.23 55.19 40.71	119,128 127,998 196,739 206,937 223,158 201,196 158,912 1,880,661	22.48 23.45 35.96 39.15 40.78 37.97 29.11 29.20	1,632,843 1,974,317 2,537,102 2,647,129 3,105,985 3,558,363 3,130,746 27,742,225	42.68 46.09 52.25 61.81 52.79	380,616 446,678 572,709 618,488 701,125 829,455 708,314 532,072	4.29 4.42 4.43 4.28 4.43 4.29 4.42 52.14
ø	10,001,004	70.17	1,000,001	20.20	2003 4 22,220	00.00	002,012	

ages of capacity operated for 1939 are calculated on weekly capacities of 1,243,153 gross earth ingots and 122,248 gross tons bessemer ingots; total, 1,365,401 gross tons; based capacities as of Dec. 31, 1938, as follows: Open-hearth ingots, 64,817,994 gross tons; osts, 6,374,000 gross tons.

ages of capacity operated for 1938 are calculated on weekly capacities of 1,218,342 gross mere are the capacity operated for 1938 tons of bessemer ingots; total, 1,341,856 gross tons; mulal capacities as of Dec. 31, 1937, as follows: Open-hearth ingots, 63,524,356 gross mer ingots, 6,440,000 gross tons.

PRODUCTION

■ STEELWORKS operations last week advanced 1.5 points to 53.5 per cent. Increases were noted in seven districts and a decline in one: four were unchanged. Year ago the rate was 25.5 per cent, two years ago 74 per cent.

Youngstown, O.—Up 3 points to 51 per cent, 44 open hearths in production. The rate has gained 9 points in three weeks. Another open hearth is scheduled to be added this week.

St. Louis—Increased 9.5 points to 47 per cent. Three open hearths were added, and one taken off the active list.

Detroit — Unchanged at 57 per cent, one interest holding production level with shipments, with no additions to stock.

Birmingham, Ala.—Up 7 points to 67 per cent, 14 open hearths active.

Pittsburgh-Minor revisions raised the rate 1 point to 43 per cent.

Wheeling - Additional production at one plant advanced the rate 3 points to 73 per cent.

New England-Rose 5 points to 40 per cent. Indications are for lower rate this week as one plant closes until July 9.

Buffalo - Steady at 44 per cent. One additional blast furnace has been lighted.

Central eastern seaboard—Held at 37 per cent. Little change is expected for remainder of June.

Cincinnati-Reported second successive increase of 8 points, to 68 per cent. Part of recent gains are in anticipation of July curtailment by American Rolling Mill Co. for realignment of rolling facilities.

Cleveland—Steady at 53 per cent despite minor adjustments by all producers. Some mills will increase schedules this week.

Chicago—Declined 1 point to 52.5 per cent, due mainly to reductions by smaller mills.

Revises Auto Estimate

Subsequent to its estimate of automobile production for the week ended June 10, as reported on page 40, this issue, Ward's Reports revised its figures, increasing output to 65,265 units. According to the revised estimate, General Motors produced 30,640; Chrysler 8145; Ford 17,600; all others 8820.

Foundry Strike Settled

■ Strike at Pittsburgh Steel Foundry Corp., Glassport, Pa., was settled last week, pickets withdrawn from mill gates, plans made to return to production basis this week. The strike started March 2 in protest to proposed 15 per cent wage reduction.

MEN OF INDUSTRY

C. F. GOLDCAMP has been appointed manager of sales, cold finished department, Jones & Laughlin Steel Corp., Pittsburgh, to succeed the late J. D. Allen. Mr. Goldcamp started with Jones & Laughlin in 1923, after graduating from Lehigh university as a chemical engineer. His first position was in the inspection department, Pittsburgh works. Subsequently he became assistant chief inspector; chief inspector, Soho works; contact man for hot rolled and cold finished products, in the general metallurgical department, and salesman in the cold finished sales department.

J. T. Leach, representative of the metallurgical department, American Steel & Wire Co., Cleveland, sailed from New York June 2 on a tour of South American markets for the company.

J. Frederic Wiese, who since 1935 has been assistant to vice president, Lukens Steel Co., Coatesville, Pa., has been appointed general manager of sales. After graduating, Mr. Wiese was associated four years with the Chicago sales office of Parkesburg Iron Co. He then was transferred to the company's home office. He joined Lukens in August, 1926, and has served in its flanging, railroad and general sales departments. He was appointed assistant to vice president in charge of sales in 1935. Mr. Wiese is a member, American Iron and Steel institute.

G. S. Crane, associated with Cutler-Hammer Inc., Milwaukee, 29 years, has been elected vice president in charge of sales and engi-



G. S. Crane



C. F. Goldcamp



J. Frederic Wiese

neering. He will supervise development work as well as the engineering, drafting and patent departments. In 1931 Mr. Crane was elected a director and in 1935 was named vice president in charge of sales, which position he held until his recent appointment.

George D. Moomaw has been appointed works manager, Rustless Iron & Steel Corp., Baltimore. The past 13 years he was associated with Crucible Steel Co. in an engineering and managerial capacity.

W. L. Weaver, formerly special representative, Allegheny Ludlum Steel Corp., Pittsburgh, working out of the Watervliet, N. Y., office, has been appointed district sales manager for the New England territory, with headquarters in Springfield, Mass. J. F. Dolan Jr., previously district sales manager in New England for products of the tool steel

division, has been made a district sales manager, land territory, in which a of the corporation will be a second

M. B. McCafferty has be district sales manager of Steel Corp.'s new discoffice in the Termin Cleveland. Harvey O. Wheeling's resident salen Cleveland for a number will be associated with M Cafferty.

Oliver Smalley, preside hanite Metal Corp. and Research Institute of An Pittsburgh, sailed for Lor 10. He will spend about the visiting various Meehan facturers in England, C Europe, Norway and Sweet

Fred T. Llewellyn, wif June 1 as research engine United States Steel Corp ware, after nearly 50 yea with the corporation, Str. page 20, was presented, eve of his retirement f ness, with an engrossed of appreciation for his co to the structural steel f industry by the American of Steel Construction, New

Walter F. Perkins has bed a director, Koppers (burgh. He joined the for lett Hayward Co. in 1915 as superintendent, and was generated by the following to Worthington Pump & Corp., Harrison, N. J., as wager. Returning to Bartward in 1932 as vice presigeneral manager, he later president, a position he held company was absorbed as of Koppers in 1936. He vice president of Koppers that time and is in charge



Walter F. Perkins

layward and American Piston Ring divisions, laryland Drydock Co., a

Fisher, formerly eastern anager, Colorado Fuel & Denver, has been elected at sales, hot rolled produceding W. H. Messner, who assigned to other duties eral offices. He has been with the company since

Rimbach has been named adviser to R. C. Enos, Standard Steel Spring polis, Pa. He will work.



Richard Rimbach

levelopment and promotion w process for applying to core-free metallic coat. Mr. was formerly director of Standard Steel Car Co., or f Metals and Alloys, and ecently consulting metal-engineer.

in A. Evans has been apsales manager, Pressed Steel o., Milwaukee. Mr. Evans in a member of the com-



Norman A. Evans



E. Earl Fisher

pany's sales force since 1931. After completing his education in engineering, and before becoming associated with the Pressed Steel company he was engaged in manufacturing, design and sales engineering work for more than four years.

Herbert H. Rogge, formerly manager of the syndicate division of Westinghouse Electric International Co., New York, has been named manager of Westinghouse Electric & Mfg. Co.'s agency sales department, with headquarters in Pittsburgh. Mr. Rogge joined the International company in 1926, following four years of general engineering work with the parent or-



H. H. Rogge

ganization. He served as special representative in Manila, P. I.; later was transferred to Soerabaya, Java; returned to New York in 1929 as syndicate representative of the company, and was promoted successively to manager, syndicate division; manager, New York sales; and sales manager.

E. E. Tross, the past seven years general superintendent, Youngs-

town, O., plants of United Engineering & Foundry Co., Pittsburgh, has been named district manager at Youngstown. He succeeds George W. Knotts, who has retired after serving the industry 52 years. Mr. Tross returned to this country two months ago from Great Britain where he finished building a new steel plant for Richard Thomas Co., at Ebbw Vale.

Vincent Delport, European manager of STEEL and other Penton publications, was awarded the gold medal of Association Technique de Fonderie at its eighteenth annual convention in Paris, May 20, for his activities in developing goodwill and relationships between the foundry associations of various countries. Mr. Delport is European representative of the American Foundrymen's association and past president, International committee of Foundry Technical associations. Silver medals were awarded to J. M. Espana, vice president of the Association Technique for services rendered to that organization and also for the time and effort he has devoted as chairman of the International Dictionary committee, and to J. Challansonnet for technical contributions in the field of alloy cast irons.

DIED:

■ H. G. MOORE, 74, formerly vice president and general sales manager, Keystone Steel & Wire Co., Peoria, Ill., in Peoria, June 2. He retired 14 years ago.

Harry B. Thompson, 50, production manager Clark Equipment Co.'s works in Buchanan, Mich., June 6. He had been with Clark Equipment since 1926.

Walter J. Miller, formerly works manager, American Steel Foundries, Chicago, and the past four years with the Keokuk Steel Casting Co., Keokuk, Iowa, recently in Mercer, Calif.

Thomas F. Cole, 77, formerly identified with the Lake Superior iron ore and Michigan copper industries, in Pasadena, Calif., June 3. He joined Oliver Iron Mining Co. as superintendent at Ironwood, Mich., in 1897, served as general superintendent until May 10, 1901, when he was chosen president. He resigned in February, 1909, to become interested in copper mining.

Thomas B. Metzger, 59, Cleveland consulting engineer and former superintendent of the engineering department of Cambria Steel Co., and the Johnstown Water Co., a subsidiary of Bethlehem Steel Co., May 25 at his home in Lakewood, O.



WASHINGTON

■ STEEL industry is not opposed to the national labor relations act and to the principles upon which it is based, Walter S. Tower, executive secretary, the American Iron & Steel institute, told the senate committee on education and labor last week at its hearings on proposed amendments. He summarized seven changes which the steel industry believes necessary to accomplish the declared purposes of the act.

Mr. Tower often was interrupted during his statement by Senators Thomas, Utah, and Ellender, Louisiana, who insisted on getting into the record matters entirely foreign to the labor act. Thomas, a member of the LaFollette civil liberties committee, interjected many questions and comments on the steel industry's labor problems with especial reference to public relations and publicity.

Senator Ellender dealt at length in questions and comment on the opposition which the steel industry had originally had to the enactment of the Wagner act. Mr. Tower stated the opposition was based only on the feeling the bill did not fully guarantee the right of self organization by employes. He said the institute had always believed in collective bargaining.

Explains Industry's Opposition

Mr. Tower said that when the act was being considered by congress many members of the industry believed its provisions and the administrative procedure would not accomplish the purposes sought and the industry believes "the results of the operation of the act have fully justified the fears which members of the industry expressed when the act was before congress. Now. therefore, that your committee is considering the amending of the act, the institute believes that it should present to your committee the views of the industry with respect to certain fundamental principles which in its opinion should be recognized in any federal legislation regarding labor relations."

The industry believes, he said, that no one can properly deny that under the act as it now stands those liberties are not fully protected. The real question is how can the act be changed so that it will afford complete protection to those liberties.

"The act expressly recognizes and protects the rights of employes to strike," Mr. Tower continued. "It does not expressly recognize or protect the right of every American citizen to work. The act should do that, and in such clear manner as will require the effective enforcement of that right.

Present Act Promotes Strife

"If the act is to be so applied as to cut off the normal intercourse between employes and employers, it will surely promote unrest and even strife between them. To prohibit employers from expressing their opinions or giving advice to their employes with respect to matters having to do with labor relations tends to create a barrier between them and to promote industrial discord and strife to the detriment, not only of employers and employes, but also of the general public.

"In conformity with the declared purposes of the act employes should have full freedom to decide for themselves whether or not to join any labor organization. In its failure to afford to employes protection from interference, restraint or coercion by other employes or by organizations of employes, the act fails to accomplish its purposes."

The witness told the committee the act should be so changed that it will afford adequate protection to employes against interference, restraint and coercion by anyone in the exercise of their rights to full freedom of choice in self organization and in the selection of representatives for the purpose of collective bargaining. He said that the

act does not now afford protection to employes in cise of their rights.

Mr. Tower said he did n to suggest the specific phoof any amendment, but onl "the general principles w steel industry believes shoul lowed in determining what ments are necessary to at the purposes of the act."

Changes the steel indulieves necessary to accomdeclared purposes of the ac

1—To provide full provemployes in the exercise of lective bargaining rights atterference, restraint or coanyone.

2—To safeguard the right speech by specifically permiployers to express opinion confer and advise with emp

3—To permit a direct appcourts by both employes and ers from labor board deel garding the representation ployes.

To provide that, in a proceeding to enforce or board decision, findings of the board shall be conclusive supported by the evidence.

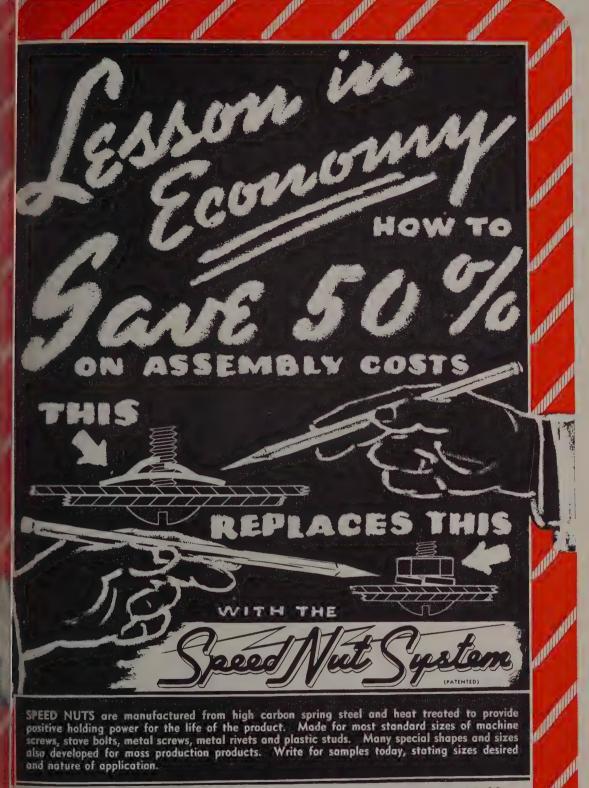
5—To limit the time with the board may issue a com volving an alleged unfair la

6—To place the prosecu judicial functions under (' separate and independent o

7—To enlarge the body shall adjudicate cases unde sufficiently to insure full et ion by one or more of its of all cases presented to i cision.

CRITICAL MATERIALS B SIGNED, BECOMES LAW

The strategic and critic rials bill for the accumul stockpiles of essential n which has been pending for two sessions, has been signs the President, as expense.



SPEED NUT DIVISION 11

TINNERMAN STOVE & RANGE CO. 2039 FULTON ROAD, CLEVELAND, OHIO

Manufacturers of Patented SPEED NUTS

fact it is an administration measure

authorizes expenditure of Bill \$100,000,000 over a 4-year period from June 30 for the purchase of strategic materials. An authorization of \$500,000 a year for the same period is also provided, of which amount \$350,000 will be for the bureau of mines and \$150,000 for the geological survey for metal and mineral explorations.

This is merely an authorization bill and does not carry the actual appropriation. There is feeling in Washington the President will not favor an appropriation of more than \$10,000,000 for the coming fiscal vear.

AWAIT DECISION IN STEEL WAGE CASE

Court of appeals of the District of Columbia has not yet issued its decision in connection with minimum steel wages set by the public contracts board under the Walsh-Healey act.

Those who have watched the situation closely believe the court is divided and effort is being made to reach some kind of a compromise.

The labor secretary's ruling on steel wages has now been in the courts for some months. The district court ruled the decision was not "arbitrary and capricious." Case then was carried to the court of appeals which decided the minimum wage decision should be suspended until the final decision of the court.

WAYS AND MEANS COMMITTEE HEARS TAX REVISION PLAN

House ways and means committee, which originates all revenue legislation, continued tax hearings last week. Chairman Doughton, North Carolina, announced the committee would confine hearings to corporate taxes. He said, however, those who wished might file briefs regarding income and excise taxes. These briefs, he said, can be considered by the tax subcommittee and the ways and means committee in writing its tax revision bill.

Waysⁱ and means members have emphasized that a tax must be passed by congress and signed by the President by June 30 when the excise or nuisance taxes expire. The committee expects to propose continuing the excise taxes which bring in one-half billion dollars a year revenue and, in addition, will suggest several revisions in corporate taxes.

John W. Hanes, undersecretary of the treasury, indorsed the tax recommendations made earlier Secretary Morgenthau. As related in these columns, they included removal of tax irritants such as the undistributed profits tax, and the

capital stock and excess profits taxes.

Mr. Hanes also said the budget could not be balanced, at present, by merely cutting expenditures, but that a larger national income was necessary. Stimulation of private investments and enterprise, he explained, would provide the larger national income he said was necessary to provide sufficient federal revenue to balance the budget.

Noel Sargent, secretary of the National Association of Manufacturers, also appeared before the committee and recommended a constructive federal tax revision. He told the committee there are eight elements which, if eliminated, would be a real help to business recovery.

These were: Reduction of federal surtax rates which discourage investment of savings in private industry; abolition of the present capital gains and losses provisions in the federal income tax; exemption of corporate dividends paid to individuals from normal income tax since this involves double taxation; elimination of the taxation of intercorporate dividends which results in double taxation; abolition of the undistributed earnings tax; abolition of the combined federal excess profits and capital stock taxes; elimination of the ban on consolidated returns; and elimination of the ban on offsetting previous capital losses against current profits.

Mr. Sargent submitted-with regard to the proposal to abolish capital gains and losses provisions in the federal income tax-that with benefit to the taxpayer and without injury to the treasury, the present law should be amended so that all capital gains and losses of corporations shall be treated as ordinary income and loss for the purposes of taxation.

In urging elimination of taxation of intercorporate dividends Mr. Sargent said:

"Under present business conditions the industrial subsidiary relationship is often a necessary piece of business machinery; such necessary pieces of business machinery cannot be destroyed without loss to investors, disruption of the business mechanism, and a brake on industrial production and employment. The indiscriminate taxation of intercorporate dividends directed at so-called 'holding companies' detrimentally affects thousands of legitimate industrial subsidiary relationships of an entirely different character."

PROPOSES APPELLATE COURT FOR PATENT CASES

Copy of a proposed bill regarding legislation for the creation of a circuit court of appeals for patents was sent to congress las Secretary of Commerce

The bill, proposed for enactment, provides for lishment of a single 5-12 to decide appeals involv lidity, ownership and in of patents, with jurisd patent cases in the University proper and in the installar sions.

HOUSE MAY VOTE PROT OF LABOR RELATIONS

Congressional leaders the Chief Executive that gress gets an opportunit on amendments to the W at this session the house will pass a resolution cal. complete investigation tional labor relations boa

Representative Cox. sometime ago introduce resolution and it is unce campaign is being made in to obtain support for it. has stated that he will asl committee to approve his unless the labor committee out amendments to the W in time for action this s

Expression from leade house is to the effect the undoubtedly act favorab resolution is brought to for the appointment of house committee to inquir boards activities.

GOVERNMENT IRON, ST AWARDS TOTAL \$863,39

Government steel awa under the Walsh-Healey a week ended May 27 were: Foundry Co., San Francisc J. Edward Ogden Co., N \$83.460; Assoc. Piping & Ltd., Los Angeles, \$167,600 Steel Co., Washington. (estimated); Carnegie-Illia Corp., Washington. Worth Steel Co., Claym \$21,329 (estimated); Cen & Steel Co., Harrisburg. 198 (estimated); Lukens Coatesville, Pa., \$73.183 mated); American Bridge New York, \$58,713.60: Steel Co., New York, \$17,94 mated); The Ohio Corrug vert Co., Middletown, O., The Ingalls Iron Works mingham, Ala., \$45,750; F ling Steel Co., McKeesport, 284.20; Wire Rope Corp. of Inc., New Haven, Conn., § The Van Dorn Iron We Cleveland, \$48,900; Parish Steel Co., Reading, Pa.. Carlisle Foundry Co., Car \$20,564.16; Walter Kidde & New York, \$61,280; and Th biana Boiler Co., Columb \$17,101. Awards totaled \$8

TION

ABY NEEDS LIFTING RTS TO \$100,000,000

S of aeronautical prody at record levels, are show further gains in x months. Most of the y orders recently placed powers must be filled is estimated shipments \$100,000,000, as against for 1938.

constitute approximately t of the year's output. past five years exports \$143,000,000 representper cent of total produc-

raft exporter, the United 38 shipped 45.6 per cent 000,000 world total. Next vere Great Britain and

customers today are d Great Britain, while last year's leading buyer. rican markets are gradulost by domestic plane-German and Italian buildteronautics authority re-

on recently passed by rovides \$1,800,000 for exle naval aircraft factory lphia, now constructing anes. Funds will become July 1 with start of the

timental & Western Air tablished at Kansas City, engineering department inch and development, D. W. Tomlinson, chief Last week this line anservice expansion, the ng 1939, bringing to 24

per cent its increase in scheduled seat-miles.

First builder of large airplanes to adopt assembly line production similar to that of the automobile industry is Boeing Aircraft. This company has just set up such a production system in its 175,000-square foot No. 2 plant at Seattle, will turn out 22-ton "flying fortress" bombers for army air corps. Special production lines of wings and sub-assemblies lead up to the main line, where planes progress through eight assembly stages.

Ford Motor Co. of France, Asnieres, France, plans to form a new Fordair division, and will equip a plant for producing mili-

tary planes.

Solar Aircraft Co., San Diego, has booked an order from Glenn L. Martin Co. for engine cowlings and stainless steel exhaust manifolds costing \$90,000.

Announce New Products

Aircraft division of Fafnir Bearing Co., New Britain, Conn., announces two new series of extraheavy capacity bearings designed for large planes. Said to be highly corrosion-resistant, these bearings are prepacked with lubricant.

Use of diesel engines in aircraft may be facilitated by equipping the diesel-powered craft with a small electrical cracking unit, according to experts of the Ethyl Gasoline Corp. The unit would crack the slow-burning "safety fuel" to realize the more volatile fixed gas necessary for starting, thereby eliminating need for special starting fluids.

International Derrick & Equipment Co., Columbus, O., has inaugurated a new line of all-steel, sliding-door airplane hangars, using 26-gage galvanized corrugated sheet.

New Welder For Aircraft

Stainless steel, alu minum and duralumin airplane assemblies are welded at Ryan Aeronautical Co.'s San Diego plant with this new spot welder. Designed by Ralph Thacker, head of the Resistance Welding division, Harvey Machine Co., Los Angeles, it may be operated with arms spaced 4 to 18 inches apart, under pressure up to 1500 pounds. Machine can be converted into a continuous seam welder

New Ships Take 70,000 Tons Steel

TWENTY-FOUR vessels awarded by the navy last week will require about 40,000 tons of steel, and bids will be opened July 11 for twelve C-1 maritime commission cargo vessels needing 30,000 tons.

The navy awards represent \$355,000,000, of which more than \$100,000,000 is in contracts to private yards. These vessels come under the 1940 building program for which funds have been provided in the naval appropriation act recently signed by the President, and the second deficiency act of last year.

Newport News Shipbuilding & Dry Dock Co., Newport News, Va., was awarded a 20,000-ton aircraft carrier at \$31,800,000. Bath Iron Works, Bath, Me., and Federal Shipbuilding & Dry Dock Co., Kearny, N. J., each received two 1630-ton destroyers, totaling \$9,626,000 and \$9,790,000, respectively.

General Motors Corp., Detroit, and Fairbanks, Morse & Co., Chicago, shared a \$5,430,576 order for six sets of submarine propelling equipment, three each. Federal Shipbuilding & Dry Dock Co. and Bethlehem Steel Co. each received a contract for two light cruisers to cost \$12,226,000 each. Electric Boat Co., Groton, Conn., was awarded three submarines at \$2,937,000 each.

Two Battleships Awarded

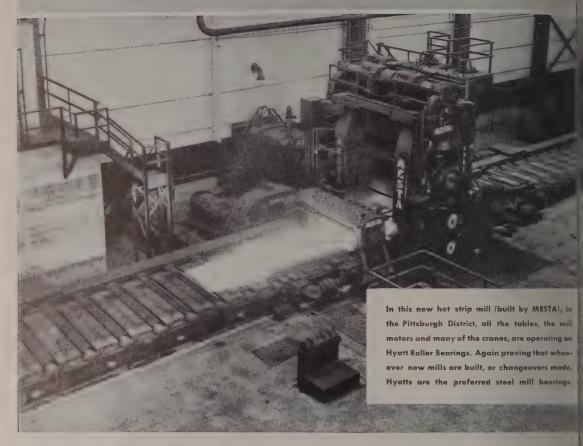
Awards to navy yards included two 45,000-ton battleships, four destroyers, four submarines and two small seaplane tenders.

The maritime commission C-1 cargo ships are a new classification, smallest of the three types, with deadweight of about 8000 tons, compared with 9200 tons for C-2 vesels and 12,000 tons for C-3 ships. Maritime commission has placed 14 contracts this year, all for C-3 ships. Placing the 12 for which bids have been asked will bring the total to 26, just over half the 50 craft the commission plans to build annually in its 10-year program.

American bureau of shipping reports 129 vessels aggregating 631,850 gross tons were under construction to its classification June 1. This compares with 152 vessels of 654,890 gross tons May 1, and 119 vessels of 464,095 tons a year ago. Of the June 1 total 72 were seagoing vessels of 611,750 gross tons, seven units of 12,160 gross tons total having been added during May.

orders for fabricated steel plate in April totaled 35,844 net tons, compared with 29,784 tons in March and 21,958 tons in April, 1938, as reported to the census bureau.

FOR Speed and Endurance



In the smooth functioning of mechanical equipment the design engineer knows well the importance of Hyatt Roller Bearings . . . how efficiently they operate . . . conserve power . . . obviate wear, attention and replacement. All made possible by the qualities of speed and endurance we build

as they grow greater in performance Hyatts are used in greater numbers. Where and when can we serve you Hyatt Bearings Division, General Motors Sales Corporation, Harrison New Jersey; Chicago, Pittsburgh Detroit and San Francisco.

HYATT Roller Bearin



OTORDOM

Material appearing in this department is fully protected by copyright, and its use in any form whatsoever without permission is prohibited.

DETROIT

G the facts on motor car ce, determining deficienficiencies in materials and into motor car construcproviding a measure of competition is doing are I provinces of the autooving grounds.

grueling dashes around oop, up 27 per cent grades, ater and mud, and poundevery conceivable type of will provide true measures f in an automobile and of oing to happen after the es delivery of a new car. Motors Corp. in 1924 set ving grounds at Milford, Mich., a location selected because of the ideal terrain for test purposes and because of the central location with respect to the various divisions

Ordeals for Autos

Car with test equipment entering the 3.8-mile speed loop at proving grounds. Note speed lanes indicated by overhead markers. Inset shows 27 per cent grade, steepest on the grounds and built to simulate a hill in San Francisco. Level portion halfway down represents a cross street. Average 1939 model will barely make this grade in second gear from a standing start

of the corporation-25 miles from Pontiac, 35 miles from Flint, 50 miles from Lansing and Detroit. At the start about \$1,000,000 was appropriated to establish this field laboratory covering 1268 acres. Since that time another \$1,000,000 has been added to the original investment.

Facilities at the grounds are offered to each division of the corporation free of charge, for any use they care to make of them, and an experimental garage or shop is maintained by each division. Normally there are 150 division engineers at work on the proving grounds, and a staff of an additional 175 is busy on tests for the corporation itself. All come under the gen-



eral supervision of A. J. Schamehorn, director of the grounds.

The work of the proving grounds' staff is of especial interest. Each year cars of all makes both domestic and foreign, are purchased and brought in for tests, 93 being on hand at present. They are torn to pieces, scaled, measured, weighed, reassembled and the car driven for, say 25,000 miles, and then torn down again and re-inspected. From these tests emerges a great mass of data on competitive makes of automobiles, and it is a simple matter to stack these results up against those obtained from the corporation's own cars, thus getting comparable performance statistics. But these data are kept within the close confines of key executives in the corporation and chief engineers of the various divisions. None of the results is permitted to reach or be used in any way by sales departments.

The proving grounds are located on a plot about 1.5 miles square. Main test track is a 3.8-mile paved speed loop, triangular in shape with the turns banked so that the forces in a speeding car are always normal to the pavement. Speed lanes are established by overhead markers and while drivers are not held down on speeds in the straightaways, they must keep to 80 miles per hour on the turns, although the turns are designed to be good for 120 miles per hour.

75,000,000 Miles, One Death

It is a favorite stunt of test drivers taking visitors around the speed loop to run their cars into a turn at about 80 miles per hour, then take their hands off the steering wheel, turn around to the visitor and ask for a match. This usually proves highly disconcerting, as the passenger fails to appreciate that the banking of the turn is such that a car will track perfectly around it and does not require any assistance from the driver in keeping to the lane.

In the 15 years of operation of the proving grounds during which time 75,000,000 car miles have been rolled up, only one fatal accident has been encountered, suggesting that a person is perhaps safer on the proving grounds than on the average highway, because of the careful control of all conditions in testing operations.

One straightaway on the speed loop is 11/3 miles in length and has been made straight and level to within 0.1-foot. A second similar straightaway is placed at right angles so that wind effect can be discounted. A 240-foot diameter concrete skid pad is used for braking and turning tests. Another portion of road may be flooded with water up to several feet deep for study of the effect of water on brakes. An-

other 1000-foot stretch of dirt road may be converted into mud several inches deep in 15 minutes by means of water pipes along both sides. A standard test hill 2900 feet long at a uniform 7 per cent grade is provided, as well as numerous other shorter hills with grades ranging up to the steepest, 27 per cent.

All in all, 23 miles of roads thread through the proving grounds, varying all the way from mere tracks through brush and the rough Belgian block pavement up to the modern concrete high-speed roads.

Supplementing road facilities are the shops where a score of different tests can be carried out on motor vehicles. Recently installed is a single-story sound laboratory where elaborate equipment is installed to record car noises down to the last

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce 1937 1938 1939 353,946 399.186 227,130 Jan..... 383,900 202,589 312,141 Feb.. Feb...... March.... 238,598 389,489 354,263 April.... 238,133 4 mos. . . . 1,855,339 906,475 1,409,839 540,377 521,153 210,183 *306,000 May..... 189,399 June 150,444 96,936 89,623 July..... Aug..... 405,072 175,630 337,979 Sept. 215,296 Oct..... Nov..... 390,350 347,349 407.016 Dec..... Year 5,016,437 2,655,777

*Estimated.

Estimated by Ward's Reports

Week ende	ed:	1939	1938†
May 13		72,375	47,415
May 20		80,145	46,810
May 27		67,740	45,120
			26,980
June 10		62,395	40,175

†Comparable week.

	Week E	nded
	June 10	June 3
General Motors	30,640	23,670
Chrysler	8,205	1,100
Ford		1,600
All others	8,820	6,075

half a decibel. Another feature here is a chassis dynamometer erected so that rollers accommodating the car wheels are flush with the roof, the car being hoisted up to the roof and rolled on the dynamometer, permitting the car to be entirely removed from the room in which instruments and recording apparatus are installed.

The proving grounds even has its own weather bureau from which regular data are obtainable on temperature, humidity, barometer, wind velocity and other factors which might exert an effect on test information from day to day.

This division of General Motors is

continually "putting through its paces," and ing studies made serve gineers and designers of car divisions constantly toes, for they know any might make will come face quickly at the provand be recorded into the tory of the corporation'

■ SALES figures for fi manufacturers for the m show an average gain cent over the same mont Including cars and truck

1	otal f
	May
Chevrolet	77,123
Ford-Mercury	69,816
Buick	
Pontiac	15,766

Last year production 700 units from May to year, with May product 300,000 units, production more appreciably, mainly of the Briggs strike and tieup of Chrysler assemates on June product assembly of around 22 drop of 75,000 from May

An agreement was tween the Briggs mana the striking UAW-CIO the latter having won a point in being accorde bargaining rights or effethrough elimination of the previous contract lated the union was redits members only a provincluded in most of the UAW has with other turers here.

Martin Plans New

Following formal rat the agreement Wednesd members, it was expusould be resumed specclosed Briggs plants, and for Chrysler Corp. in plants would open immed operations were resumed By Wednesday afternoon stop-shipment orders ing through, indicating week closed plants would swing once more.

Homer Martin's wing has been formally re charter in the American of Labor, establishing h now as the UAW-AFL auto industry. According tion from the Martin c votes were received on t affiliation, with approve the ratio of 20 to 1. Mari poses to move in on t farm implement and to industries for membersh ing the backing of th AFL, he might be able t a lot of fireworks with comrades in the CIO.

COMPLETED!

rld's 4th Longest Suspended Span

-The Bronx-Whitestone Bridge





THE Bronx-Whitestone bridge, spanning the East River, is the key structure in a 5-mile express highway connecting the Hutchinson River Parkway with Long Island's high-speed traffic network. It constitutes one of the most important links in the Circumferential Parkway system which, eventually, will completely girdle New York City. For travelers between the New England states and the New York World's Fair on Long Island, it affords a traffic by-pass skirting New York City and saving a distance of some 8 miles.

The entire 11/4 mile bridge superstructure, ready for service even to the finished roadway and lighting system, was under contract to American Bridge Company. Geared to perhaps the fastest construction schedule ever attempted on a large-scale engineering project, the work was actually completed in 18 months — one month ahead of contractual obligations.

This construction performance offers striking evidence of the fact that, regardless of the size of the operation, when time is short and the utmost speed is essential to meet the exacting need of ON TIME fabrication and erection, you can count on American Bridge Company's facilities and personnel to adequately deliver.

MERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit

Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, Pacific Coast Distributors . United States Steel Products Company, New York, Export Distributors

NITED STATES STEEL



Reciprocal Buying Cuts Both Ways

■ RECIPROCITY long has been blamed for many of the so-called evils in business. Many a "lost" order has been attributed to it. Small companies making a few products often declare they have no chance to compete with larger organizations producing a greatly diversified line. However, it is indicated that, more and more, sales and purchasing departments are coming to realize that reciprocity is an unavoidable factor in doing business and are facing the attendant problems squarely.

Selling is accomplished by various methods, including personal calls, advertising, direct mail, demonstrations and a fifth method, the fulfillment of mutual obligations or "reciprocity." Results from the first four methods are dependent largely upon a combination of quality, service and price.

Reciprocity, in itself is basically even more simple than the four factors previously mentioned in that it is directly traceable to the ancient principles of barter. Today, it has developed into a powerful influence in transacting business, and many condemn it as an unfair method of competition.

As Sales Argument Reciprocity Must Be Handled with Discretion

When reciprocity is used as a method of forcing a customer to buy a product of poor quality or not suited to his requirements, there is no questioning the fact that it becomes obnoxious and an obstruction in the flow of normal business. When it is used as a means of discharging friendly moral obligations, little criticism is justified

A good many purchasing agents object to reciprocity on the ground that it violates the principles of sound buying, especially when they are forced against their better judgment to sacrifice quality, price or service. The growth of the practice is indicated by the fact that many companies have set up separate departments to maintain a complete record of suppliers and use the data in influencing sales.

Tactfully handled, such data are of undeniable assistance to the salesman. often, unfortunately, the salesman uses reciprocity as his first argument and sometimes overplays his hand, thus unnecessarily impairing the cordial relations between two companies. The purchasing agent for a large machinery builder tells the story about the pig iron salesman who came in, seated himself comfortably, and pugnaciously declared that he wanted an order since his firm had just purchased an expensive piece of equipment. A quick examination of the records, however, revealed that the salesman's company was last on the list from a reciprocal standpoint despite the recent purchase. The salesman, of course, left crestfallen, realizing that he had overstepped the bounds of judicious selling.

Evils Tend to Self-Correction Under Stress of Competition

In the long-run, the so-called evils of reciprocal transactions tend to be self-correcting. Any legitimate business enterprise must buy the kinds and qualities of materials that are best suited for its purpose so that with its improved designs and manufacturing methods it can turn out a product competitive with those of other manufacturers in the field. If it deviates from these standards, it soon loses its competitive position and eventually fades completely out of the picture.

Reciprocity is likely to be with us as long as goods are traded although, admittedly, it is often overworked. Skillfully wielded, it may be made to produce effective results. Misused, it may be made equally effective in destroying good-will and business.



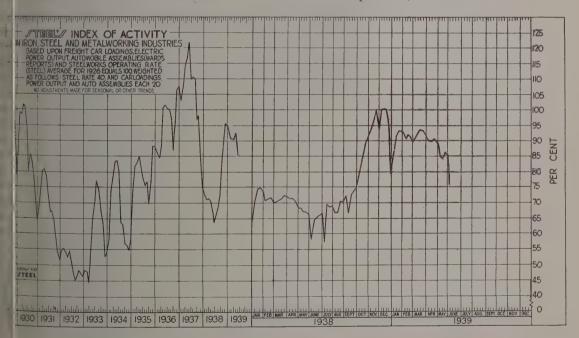
ity Index Reflects iay Interruption

TED business sentiment has become increased in the past week or two, with most industrial ial indicators recording a favorable showing verse seasonal tendencies. However business its through the next few weeks will be awaited than usual interest. If industrial activity can hold its own, or better still register a slight ind during this period of normal seasonal dull-would be good indications that the downward of the past few months has been arrested.

torted somewhat by the interruption of activity occasioned by the observance of Memorial day. Due partly to this factor and the more than seasonal decline in automobile production which was accentuated by the strike at Briggs, STEEL'S index of activity declined 9.5 points to 75.9. In the comparable week last year the index eased 8.4 points to 58.1 and in 1937 the index declined 10.5 points to 105.1.

Steelmaking operations increased four points to 52 per cent for the week ended June 3, to record the sharpest advance in any seven day period so far this year. The 6.5 points increase in the national steel rate for the two weeks ended June 3 regained all the ground lost since the first week in April. The upward trend in steelworks operations was not affected by the holiday interruption, due to the custom of the industry in not observing the holiday in that particular department.

Automobile output of 32,445 units for the week ended



STEEL'S index of activity declined 9.5 points to 75.9 per cent in the week ended June 3:

						_								
	1939	1938	Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
٠	93.3 93.2	71.3	Jan	91.1	73.3	102.9 106.8	85.9 84.3	74.2 82.0	58.8 73.9	48.6 48.2	54.6 55.3	69.1 75.5	87.6 99.2	104.1 111.2
	92.2	72.4 72.0	Feb March	90.8 92.6	71.1 71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
	90.0	71.3	April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5 122.9
	89,7 90.4	71,4 70.8	May June	85.3	67.4 63.4	121.7 109.9	101.8 100.3	81.8 77.4	83.7 80.6	63.5 70.3	54.8 51.4	78.6 72.1	101.2 95.8	120.3
	89.2	68.4	July		66.2	110.4	100.3	75.3	63.7	77.1	47.1	67.3	79.9	115.2
	85.1	68.5	Aug		68.7	110.0	97.1	76.7	63.0	74.1 68.0	45.0 46.5	67.4 64.3	85.4 83.7	116.9 110.8
	84.2	67.2	Sept		72.5	96.8	86.7	69.7	56.9					
	86.6	67.1	Oct		83.6	98.1	94.8	77.0	56.4	63 <u>.</u> 1 52.8	48.4 47.5	59.2 54.4	78.8 71.0	107.1 92.2
	85.4	66.5	Nov		95.9	84.1 74.7	106.4 107.6	88.1 88.2	54.9 58.9	54.0	46.2	51.3	64.3	78.3
	75.9	58.1	Dec		95.1	1211	101.0	00,2	00.0	0 210				

THE BUSINESS TREND-Continued

June 3 represented a decline of over 50 per cent from the preceding week, but remained above the 26,980 units assembled in the comparable week last year. Revenue freight carloadings were off 59,942 cars to 567,732 in the week ended June 3, while electric power consumption was lower at 2,113,387,000 kilowatt-hours, compared with 2,204,858,000 kilowatt-hours in the preceding week.

Business prospects through the summer months are for a relatively small revival in activity, originating in consumer spending and aided to some extent by building operations financed directly or indirectly by the government. The investment of private capital, upon which alone a broad and far-reaching revival is based, is not yet in sight.

FOREIGN TRADE DECLINED IN APRIL

Exports during April declined from the sharply expanded volume of the preceding month. Imports were also below the March level. April exports had a total value of \$230,947,000 compared with \$267,602,000 in March and the \$274,472,000 export volume recorded in April, 1938. Imports in April were valued at \$186,195,000, slightly lower than the March total of \$190,453,000. The export balance of trade in April was \$44,752,000, against \$77₆.

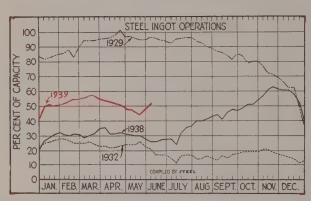
149,000 in March and \$114,645,000 export exclast year.

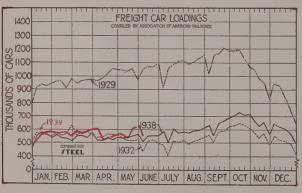
Following the general trend exports of inproducts declined during April. However, imdoubled the total for the preceding month highest level since August, 1937. Iron and sincluding scrap totaled 394,008 tons, agains March and 489,249 tons in April last yearing March aggregated 44,083 tons, compared the preceding month.

APRIL IRON OUTPUT DOWN 19.2 PER CI

Average daily coke pig iron production in States during May amounted to 55,373 gross substantially from the 68,511 daily average. However, the May figure remained well aborders tons daily average in May, 1938. Total if first five months this year aggregated 10, an increase of 51.4 per cent over the compalast year. Relating production to capacity. May averaged 40.3 per cent, against 49.8 per of the operating rate in May last year was 2 Number of stacks in blast May 31 totaled 10 with 102 at the end of April.

FI FCTRIC - POWER OUTPUT





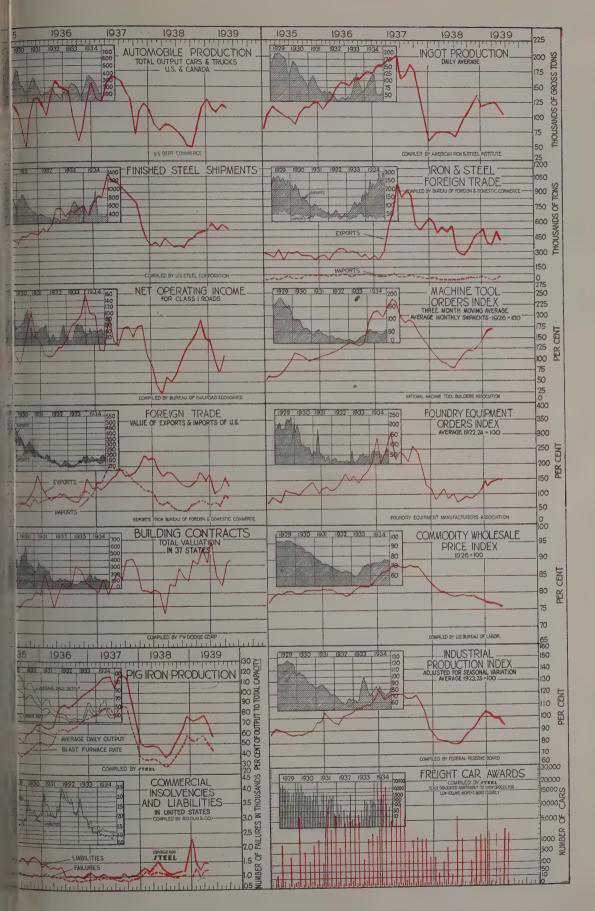
	939								
	\								
			<u> </u>	~	1			1	
	<u>\</u>	-		1938	X			V	
					V_{-}	V_			
					1929			-	_
1		-		-	1929	,		V-	
jr				, ·	<u>/</u>	V			
<i>;</i>									
			1000			1/-		\\\	
			1932	-	CI COUC	V			
		Ш				N ELECTRIC			Ш
JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
ونته	111	ست		ريس	NUTO	MOBIL	F DDC	DUCT	ON
			1			STIMATED BY			
			Ĺ	1	1	A			
-/			1929	<u> </u>	<u> </u>	1/1	1		
/ K	1939					V		1	
!								V	

1938

JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT NO

1932

	C	Steel Operation Per		e		Electric Out Million			Th	Freig Load	ht Car dings ds of C		: 1	Weekly Outpi
Week ending	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938
Feb. 11	54.0	30.0	27.0	86.0	2,268	2,052	1,578	1,726	580	543	562	956	84,500	57,810
Feb. 18	55.0	31.0	25.0	88.0	2,249	2,059	1,545	1,718	580	536	572	958	79,860	59,100
Feb. 25	55.0	30.5	25.0	83.0	2,226	2,031	1,512	1,699	561	512	636	907	75,660	56,977
Mar. 4	56.0	29.5	25.0	89.5	2,244	2,036	1,519	1,707	599	553	560	977	78,705	54,440
Mar. 11	56.5	30.0	25.5	94.5	2,238	2,015	1,538	1,703	592	557	575	946	84,095	57,438
Mar. 18	56.5	32.0	24.5	94.5	2,225	2,018	1,537	1,687	594	540	585	958	86,725	57,558
Mar. 25	55.5	35.0	23.0	94.5	2,199	1,975	1,514	1,683	605	573	561	961	89,400	56,800
Apr. 1	54.5	36.0	23.0	95.0	1,210	1,979	1,480	1,680	604	523	545	967	85,980	57,500
	53.5	32.0	22.0	95.5	2,173	1,990	1,465	1,663	535	522	545	956	87,019	60,975
	51.5	32.0	22.0	96.0	2,171	1,958	1,480	1,697	548	538	567	972	88,050	62,021
	50.5	32.5	23.0	98.0	2,199	1,951	1,469	1,709	559	524	562	1,004	90,280	60,563
	49.0	32.0	24.0	101.0	2,183	1,939	1,445	1.700	586	543	554	1,052	86,640	50,755
May 6	49.0	31.0	24.0	97.0	2,164	1,939	1,429	1,688	573	536	534	1,050	71,420	53,385 4
May 13	47.0	30.0	24.0	97.0	2,171	1,968	1,436	1,698	555	542	517	1.048	72,375	47,415 -
May 20	45.5	30.0	25.5	96.0	2,170	1,968	1,435	1,704	616	546	516	1,046	80,145	46,810 4
May 27	48.0	28.5	23.0	95.0	2,205	1,973	1,425	1,705	628	562	521	1,061	67,740	45,120 -
June 3	52.0	25.5	21.0	95.0	2,114	1,879	1,381	1,615	568	503	447	972	32,445	26,980 4





Styled by α well known industrial designer working in collaboration with the chief engineer and his staff, this new Cleveland single spindle automatic embodies numerous engineering improvements in α unified and distinctly pleasing assembly

■ WITHIN recent years the term "streamlining" has been greatly overworked. While vividly descriptive of modern mechanisms which in line of duty must "pass through the air (or water) with the greatest of ease," it hardly fits a heavy industrial machine which spends its productive life bolted to a concrete foundation. The foregoing does not in any way imply, however, that efforts of industrial stylists toward dressing up stationary industrial equipment, have in any way been misapplied. Quite the opposite is true. Consider for instance, what modern styling is accomplishing for the machine tool industry.

Since the National Machine Tool Show of 1935, a rising tide of interest in styling has been apparent among machine tool builders. This has been aroused to no small degree by the efforts of several able professional stylists who have penetrated this rather conservative industry from the outside.

It should be remembered, however, that this matter of "appearance" as a factor in machine tool design is not altogether new to the industry. Deliberate styling actually was carried to extremes in the earliest days of the industry. Back in the 1840's studied efforts were made to design machine tools to look like Grecian temples. Such efforts were of course as misdirected as would be efforts today to design them to resemble the Trylon and the Perisphere. At the same time, however, and thence down through

the most important formative years of the industry, a number of its most notable pioneers proved themselves to be not only good mechanical engineers but they also demonstrated remarkable faculties for materializing their sound engineering into pleasing physical forms.

The principle upon most of these men worked was that "what looks right is right." They kept in mind above all else that a machine tool is a machine intended to enable workmen to turn out more and better work more comfortably than they could with hand tools. Therefore, it must be designed to fit the average workman as far as controls and loading and unloading the work are concerned. It should be safe to operate. It should be easy to adjust, lubricate and clean. It should not be too expensive to build.

First Steps in Styling

These designers therefore studied the location of the controls—sometimes standing in front of a full-size drawing actually to get the feel of them. They made their castings with flowing curves and neatly rounded corners, which actually cut their cost in many cases and did away with bruising and cutting the operator on sharp corners. The machine thus became easy to wipe up and the operator was inspired to take better care of it—which in turn meant better work from the machine.

The nature of the old-time machine shops, however, was not very favorable toward showing up the

fine points of its equip as appearance was conshops were inclined to condition which was agforests of belts and a vocuntershafts. There was tendency toward neat rangements of machine they were hidden by pillars. Neither was the chine tool catalog or ac—with its harsh, angulillustrations—inclined the fine points in appearant.

GUY H

With the advent of eing, electrical drives, pmentalization and modbuildings, the short-poorly designed machine become much more read to buyer and seller alid dition was made still mapparent when catalogs tisements began to havished photographic illustrations.

It is difficult to say we shout the earliest and better appearing tools-was the user, the machinan, or the advertising any event, at the close war heavy pressure begon machine tool engine up their designs. The adtrical drive and control cause very materially a hydraulic features did it.

When certain compandesigns of notable smooning the late 1920's and the shortcomings of solder, angular and under machines became pain able—through comparinewer and smoother expenses.

unition as Key Factor in

MACHINE TOOL MARKETING

istalled. It was then that is tylists really began to iway in selling their the machine tool in-

the machine tool inlay they are practically granted", just as is the r hydraulic expert.

strations accompanying have been selected to



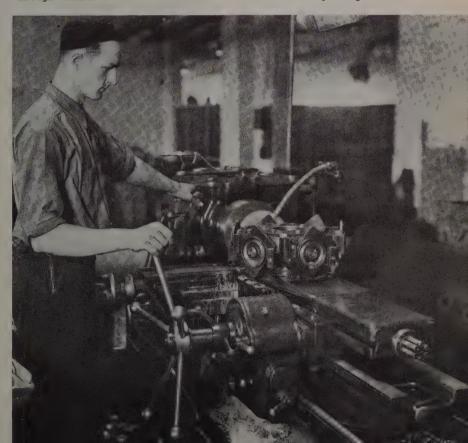
otony of a cabinet base is relieved on Taft-Peirce surer by simple vertical strips

e good commonsense stylracticed in the American
ool industry today. At the
t hand corner of facing
lears the new Cleveland
adle automatic, as styled
r Henry Adams, working
ation with Chief Engineer
attleworth and his staff.
conveniently located conbuilt-in instrumentation.
center of these pages ap-

pears a precision surface grinder which has just been introduced by Taft-Pierce Mfg. Co. In this the monotony of the familiar cabinet base has been relieved in a simple but effective vertical strips. This machine is mounted on rubber—hence the generous size of its supporting members. The large hand wheels are also functional—the elevating wheel reading to .0005-inch and the cross feed wheel to .001-inch, with graduations on their peripheries fully 3/16-inch apart for easy reading.

The illustration at the lower right has been selected primarily to show good functional design, although the machine has been carefully designed for appearance as well. Note that the location of the control levers is such that operation of this machine ---which is a Gisholt ram-type universal turret lathe—is just about as near "effortless" as anything of this kind can be. This is indicated by the entirely natural "stance" of the operator. Incidentally, a very interesting job is going on here. The parts, drop forged caster top plates, are chucked in fixtures on the turret faces instead of on the spindle. The tools, which are held in a threejaw scroll chuck on the spindle, machine the stationary parts at the rate of 100 per hour as they are whirled against them by the rapidly revolving spindle.

Operator of this Gisholt ram-type universal turnet lathe holds perfectly natural "stance" because in its designing, care was taken to "fit the machine to the man" through natural location and motion to its controls and operating levers



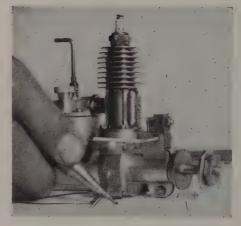
Casoline Engin

Ingenious combination of aluminum die of ings and copper brazed steel produces a horsepower tiny gasoline engine with specifrom 1000 to 8000 revolutions per minute. The net weight is only 3% ounces

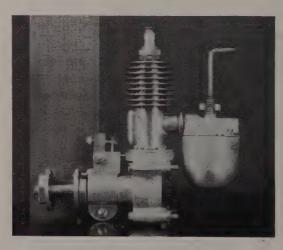
MANUFACTURE of commercial-type power units and machinery on a toy scale has grown from a novelty to a full-fledged industry. Railroad locomotives, steam engines, power shovels and numerous other mechanical units have been copied faithfully in miniature to satisfy the demands of hobbyists and mechanically minded children. One of the latest achievements in this field is the construction of small gasoline engines to drive model airplanes and boats.

Building a single-cylinder gasoline engine weighing 3% ounces may sound relatively simple, but it has involved extensive research and development of new materials, methods and even complete new

tools. By an ingenious combination of aluminum die castings, copper brazed steel and a remarkable simplification of design and assembly, Syncro Devices Inc., Detroit, has perfected a new type of gasoline engine rated at about 1/8horsepower, with speeds from 1000 to 8000 revolutions per minute and a total weight of 3% ounces. A description of how this engine is designed, how the parts are produced and assembled is a tribute to what can be accomplished with modern materials, methods and equipment. Essentially, the engine comprises the following parts: Cylinder



View from front of engine showing its small size compared with man's fingers. Commutator is mounted on crankshaft boss, with handle for control of timing and gap between points. Side view is shown below



assembly; crankcas tically, with main be half; crankshaft an hub; combined car gasoline tank; con and piston assemb tator for ignition break; cam to actu tator; spark plug; p gaskets, washers, bolts, nuts, etc. sembly comprises for of steel. Barrel S.A.E. 1112 steel from a solid bar, w ing fins at the top at the base for bo crankcase. Fin an ameter is %-inch, o eter of the barrel bore is ½-inch, ov without head is 11/2 permit broaching th

cylinder head, tapped for the eter spark plu separate on a chine and is the the finished cyl after broaching cylinder is ma drilled with fo holes in the four pairs on the lo the barrel for haust and by Two pairs of b are on one side rel, diametrica the intake a Bypass ports. covered wit stamped steel ¾ x ½ inch, at ur of the barrel. Over orts and just below the ts is placed an intake inch in diameter, made nachine and threaded to parburetor and gas tank

ver plate and intake fite spotted by tack welds. er wire is laid around y of the cover plate beg; a small slug of copped into the intake fitassembly then is passed opper brazing furnace at s Fahr. The copper lows around the joints, m secure. Parts placed avel through the elected brazing furnace on belt, the brazing operaing about 50 minutes. mosphere is reducing, a DX generator. The embly is given a final ate on the exterior for sistance.

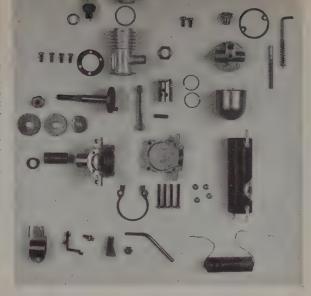
Cast Crankcase

comprises a front and tooth aluminum die castiges at top receive cylinmand mount engine when in Inside of crankcase is rightly larger than the led to the end of the which carries the pin on the connecting rod rides. Dithe crankshaft chamber h width '4-inch. A gastween the two halves to seembly airtight.

If of crankcase carries bearing in a ½-inch boss and 1 inch beyond the the casting. Bearing is g, ¾-inch outside diam-commodates the ¼-inch rankshaft. Bearing is relubricated type of comid sintered copper. A ber retainer washer fits in d of boss.

oft is S.A.E. 1020 steel, long with a 3/16-inch

Complete layout of all parts required in assembly of engine. Also shown are spark coil and condenser which are wired into ignition circuit when operating. Stampings, die castings and screw machine products comprise the various metal parts





Broaching cylinder of midget engine

thread extending back 1/2-inch on one end to receive the propeller assembly. Immediately back of this threaded portion is a squared section, $3/16 \times 3/16$ which receives a stamped steel cam that actuates the commutator. Other end of crankshaft terminates in a machined steel disk, %-inch in diameter and 3/32inch thick, which carries a 1/4-inch steel pin set in a hole, 1/16-inch from its outer edge. Pin is copper brazed into disk and disk is copper brazed onto the shaft. After brazing, crankshaft is hardened by immersion for 20 minutes in a bath of liquid cyanide at 1450 degrees Fahr. and quenching in oil. Surface is file hard to a depth of about 0.006. inch. Bearing surface is centerless ground to remove 0.002-inch of stock before assembly.

Carburetor and Tank Combined

Carburetor and gas tank unit is a cup-shaped affair, 1 inch in diameter and about $1\frac{1}{2}$ inches deep. It comprises a die cast aluminum bowl onto which is bolted a die cast aluminum top carrying a brass tube extending to bowl bottom. Upper portion of this tube cuts across the intake passage which is tapped to be attached to the cylinder intake fitting. A small hole is drilled through the brass tube at this point and a needle valve arrangement is obtained by using a pointed steel wire threaded into upper end of This wire works against a small spring and its adjustment controls flow of gasoline and thus engine speed.

A second 7/32-inch tapped hole at (Please turn to Page 62)

Model airplane equipped with midget gasoline engine. Photo courtesy Ed Manning, Detroit





Welding Galvanized S

Fusion welding of galvanized material need cause increased corrosion if properly do Same procedure as with uncoated material employed. However, a number of factors are volved if the most satisfactory job is to be tained. These are detailed and their important explained

By J. F. GALBRAITH

Service Engineer
The Linde Air Products Co.
New York

■ WELDING has been recognized as an increasingly important method of joining galvanized metals in the fabrication of galvanized metal piping, vessels, tanks and containers. Here oxyacetylene welding offers a method of fabrication having speed and economy, and producing a permanent joint.

When working with galvanized sheet, metal fabricators have found that the strength and simplicity of the welded joint enables them to make many improvements in the design and construction of their products as well as in the finished

product itself. For example, metal containers formerly were made with lock-seam and solder construction. Thickness of metal used was limited to 20 gage because of the great difficulty in making a lock seam with heavier gage metal. The welded seam puts no limitations on metal thickness and permits the designer to specify the weight best suited to the eventual use of the container. In addition, the finished container is stronger and there is no chance of seams opening up due to rough handling during shipment or service use.

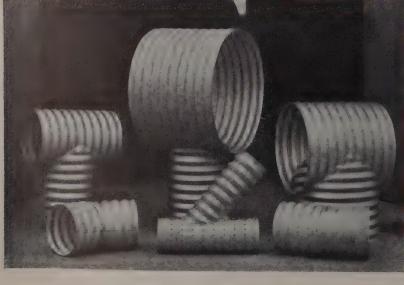
In the construction of galvanized piping systems, welding again has many advantages, such as flexibility of design, speed and economy of installation, and permanence. In contrast to the older method of mechanically joining the pipe by means

of threaded fittings, the effects no reduction in ness. Although some vanized coating is rem welding flame, this in ceeds the amount threading. Furthermore, an actually increase sistance of the ungalvin the small zone where is removed, since heating flame appears to tion of a highly resoxide.

Leave Coating

In preparation for dirt, grease and oil alc should be removed but ized coating should be Galvanized pipe can be the cutting blowpipe ence has shown that seriously affect the welding heavy objects cated shapes, jigs and for are used to assure coment.

Galvanized materials be fusion welded with ing rod or bronze welde welding is done at a loture, it has less effect vanizing than fusion wing technique for bothing and bronze weldin material is exactly the the corresponding unital, whether sheet or I should, of course, be diminimum amount of ent with good fusion, of fusion welding, an



Oxyacetylene welding p portant part in the fabric culvert specie action" when bronze

struction of galvanized systems, it is important the Lindeweld method ipe produces a considwer band of zinc volanpared with full fusion to greater speed and requirements of this

tective coating, fusion vanized material someven a coat of aluminum usly, it is not possible inside of a welded pipe experience has shown bints give perfectly satvice even without paints-welded joints give exice without any finishme products, it may be coat the finished bronze luminum paint to give ppearance.

tors affecting the welded joint proper flame const importance from the tandpoint because upon ther factors leading to lity job. Proper control flame will result in just at input to assure a Every unit of heat put d in excess of the quany needed means just so ing unnecessarily re-

e of the correct proles the operator to make Id as he goes along withback to reheat and rein parts of the finished

void Reheating

ce of proper heat input ice of reheating the weld overemphasized. Every ld be made to proceed inuous an operation as Vhen making a bronze necessity for stopping and then to dip the d in flux may result in interruptions, and unless or is careful, too much be applied. A method of he number of these in-is to heat a sufficient f bronze rod prior to the peration and roll it in will adhere to the rod flux coating. Then only n will be to pick up a

ost important factor afality of the welded galint comes under the provle designer. Results ob-

ding a longitudinal seam in diron container. Jig holds

tained in the fabrication of galvanized metal products by welding vitally depend upon the specifications that come from the design room. The designer has quite a wide latitude in which to work, but his activities must be limited by certain important considerations.

When drawing up plans for constructing galvanized metal products by bronze welding, the designer should avoid application of bronze on highly stressed areas since the presence of these stressed areas may result in intergranular penetration or cracking of the base material in that vicinity. Proper choice of joints permits the welding operation to be made quickly and smoothly.

Choosing sizes of metal parts to be joined so equal heat application can be obtained is important. When unequal thicknesses are joined, the galvanizing on the smaller thickness may be volatilized considerably before the heavier thickness has been raised to tinning or fusion temperature. When cast iron and sheet are being joined, it is advisable to preheat the casting so both

parts can be brought to welding temperature simultaneously.

Use of proper jigs also is important. Jigs designed for welding galvanized metal should embody, whenever possible, some means of quickly conducting heat away from the welding zone. In addition, they should provide the operator with maximum space and freedom of movement.

Watch Welding Fumes

Welding on galvanized metal should be done in well ventilated locations wherever possible as inhalation of zinc oxide fumes released from the galvanized coating may cause temporary discomfort if inhaled in sufficient quantities by the worker. Certain precautions should be followed. Out of doors the operator can usually work so the fumes float away from him. In fairly open indoor locations, it usually is sufficient to remove the fumes by suction or to drive them away from the worker with a stream of air. However, in more

(Please turn to Page 82)





Pallets and Trucks

Important savings are shown possible, even where items handled are comparatively small in size and few in number. Use of double-fact pallets increases handling efficiency, prevent damage to material, greatly facilitates storal and delivery operations

By R. Van HUYSEN

General Planning Dept. General Electric Co. Schenectady, N. Y.

■ MASS production is not necessary for the reduction of materials handling costs. Although perhaps the largest savings can be obtained where mass production is involved, many possible handling improvements may be ignored due to the erroneous idea that "there is not enough in it to pay." The experience of General Electric Co. indicates that it is extremely worthwhile to pay attention to even small improvements. The following ex-

amples serve to illustrate When the fork true introduced in General plants, it was used in for handling large q material, such as in the department. Later it to try and adapt this t departments where stries of light materials w. One of these departme large motor-generator where the fork truck he out for handling bruss semblies and other mitems. It has given extra fying results.

Parts Rehandled Si

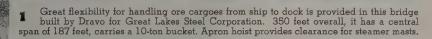
A brush holder whe on the assembly bench 60 to 90 pounds. Prior t trucks, the brush h placed on a trailer, one moved to the stockroom on stockroom shelves, When a motor-genera being assembled and a received for brush h were again, one by from the shelves, placed and transported to th erator set. At that poilifted them, one by on sembly platform. By fe route, the brush holder dled individually six t

As the first step in a



Fig. 1. (Upper)—Special sed for handling brush-hold by means of a battery-o Units are handled from m to stock, from stock to and on by crane to motor—all in a group. Fig. 2. (Lof rotor rim bolts loaded of which is on trailer, fork truck ready to be placed.





This Dravo-built whirler handles large pre-assemblies at the Newport News Shipbuilding & Dry Dock yards. Its tested capacity was 55,000 lbs. at 62 feet, $7\frac{1}{2}$ tons at 115 feet radius. Separate motors on each hoist allow for operation of all motions simultaneously. Full electric control results in elimination of mechanical frictions and brakes, provides for safe handling of heavy loads over shipyard workmen and insures against damage to heavy machinery or the hull.



Two barges abreast can be unloaded with this straight line coal unloading plant built by Dravo for the Pittsburgh & Lake Eric Railroad Company. A 7-ton bucket with fast travel handles 4,000 tons in eight hours from barge to cars and has a free digging capacity of 700 tons per hour. Plant is stationary and a shifting device controlled from the operator's cab moves barges along as unloading progresses.



This bridge now does more work than two! At Superior, Wisconsin dock of Pittsburgh Coal Company, two 6-ton coal bridges were being operated. By skillfully designing a man trolley of aluminum, Dravo raised the capacity of one bridge to 12 tons, greatly increased the speed of travel without overstressing the structure. Operating costs were reduced by eliminating the use of the second bridge.

problem is one of modernizing old equipment, olete handling machines or designing special eet new problems, consultation with Dravo Constove to be of great value to you.

coal from ship to shore in 32 lock has ample barge capacity to operation. The rig is simple but cler with a 5-ton bucket makes a barge to shore and back to s. Pittsburgh Coal Company's njoys an unusually low handling arough the use of this equipment.

Added to its ability to fabricate and erect structures such as are shown here, Dravo Corporation has had years of experience building docks, retaining walls, plant foundations—everything that enters into the problem of terminal facilities.

Bulletin 403 describes Docks, Mill Foundations and Terminal Equipment. Bulletin 202 describes Revolving Cranes. Either will be sent upon request. Inquiries relative to specific problems may be addressed to

DRAVO CORPORATION

ENGINEERING WORKS DIVISION

PITTSBURGH, PA. . WILMINGTON, DEL. . GENERAL OFFICES AND SHOPS: NEVILLE ISLAND, PITTSBURGH, PA.

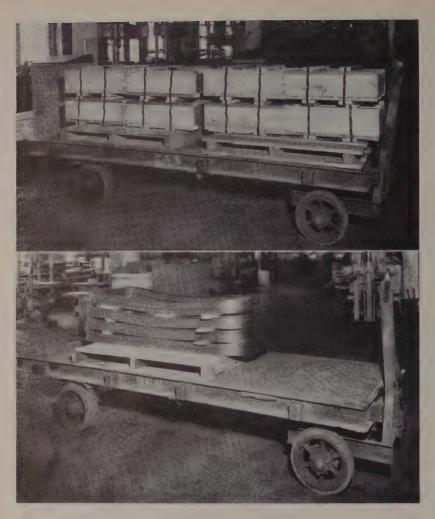


Fig. 3. (Upper)—Fork truck loads and unloads metal-bound boxes, handling them in groups of four on double-faced pallets as shown here. Fig. 4. (Lower)—Unit load of four edgewise-wound copper coils on pallet handled by fork truck

materials handling problem, special skids were constructed. These skids were planned to be used with a fork type battery truck that would carry 15 to 20 brush holder units. As will be seen in Fig. 1, this special skid has three platforms or shelves upon which the brush holder assemblies are placed. This special skid then permits brush holder assemblies to be handled in a large group.

Present procedure is as follows. The skid is placed beside the assembly bench and loaded as the operator completes the assemblies. When full, the skid is transferred to the store room by means of the battery operated, fork type truck. It remains in the stock room until the parts are needed. Then the skid, with its load of 15 to 20 brush holder units, is carried by the fork truck to the point where the motor-

generator set is being assembled. Here the whole skid is lifted by crane to the platform of the motorgenerator set.

Much greater ease in handling and a reduction in cost has resulted by adoption of this method of handling these units. Too often this materials handling problem would have been passed over, the amount of work appearing too small. However, the savings in this case were substantial.

Another instance of increased efficiency in handling which also resulted in a substantial saving was in the handling of rotor bolts. These rim bolts are used to fasten the rotor and weigh approximately 50 pounds each. Previously these bolts, made in the screw machine department, were transferred by trailers to the stockroom. They were handled, one by one, onto the trailer and then stacked, one by one, from the trailer onto the floor in the stockroom. When needed, the bolts were again loaded, one by one, onto a trailer or skid and transferred to the job. Here they were again removed, one by one, making six

(Please turn to Page 81)

A.S.T.M. Changes Publishing Specific

Important modificate be made by the Americ for Testing Materials in tof publishing its standations and tests. These cobecome effective in Novemajor change is to cobook of Standards, is mially, and the Book or Standards, issued annuchanges, which also embous advantages, are necause of the great grow standardization work.

All of the 870 A.S.T.M. are in widespread use branches of industry and Each is available and with to be available in separalet form, and also have bein triennially published standards with an annugiving the so-called tental ards and tests.

The new method of will be to issue the stantentative standards colle one triennial publication into three parts: Part Part II, Nonmetallic Materials—General for new and revised tentatards in the annual Prepart I, will be disconting to the reports and papers bound in one volume. If of the annual Book of Standards will be discontinger.

In the two years between all publication of the supplements to each of parts will be issued, convisions and new or reviards and tentative stant that year. Since these boappreciably larger than ent supplements and will manent reference value be bound in cloth. The "Methods of Chemical A Metals" published in 195 continued as a separate p

Further details of the plan and prices of the valumes can be obtained figuraters of the society, Broad street, Philadelphia

Versatile Finish

A finish that can be sprayed, dipped, air-dried and applied to wood or faces subject to exterior exposure is Kem Lustral, by Sherwin-Williams Co., This mirror-like finish around a new synthetic.



stant scientific control. We know that your main interest in bars is accurate rollings, uniform quality and analysis. You can count on these essential qualities in every bar we sell.

YOUNGSTOWN SHEET TUBE COMPANY

Manufacturers of Carbon and Alloy Steels YOUNGSTOWN, OHIO General Offices

Bars - Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Rods -Wire - Nails - Tie Plates and Spikes

AND ALLO **GSTOWN**

YOUNGSTOWN



Electrotinning Strip St

New continuous electrotinning line fuses deposited tin coating to steel strip in an oil bate giving excellent uniformity. Speeds up to 40 feet per minute with an output of 96 tons per 8-hour turn are obtained. Tin loss is practically eliminated

By JOHN S. NACHTMAN

Manager

Electrochemical Processes Division Blaw-Knox Co. Pittsburgh

■ WHEN the 4-high strip mill established itself and when continuous methods began invading many phases of steel production, continuous electrotinning and plating of strip products became inevitable, particularly since basic principles of electroplating have been understood and the process applied commercially to a limited extent for three-quarters of a century.

It may be considered that the continuous electrotinning process has been a long time in "arriving"—but that is because there has been much of a new nature to develop. From 1927 when the writer supervised the installation of possibly the first continuous unit for electrogalvanizing wide steel, there has been steady research and development to attain the most efficient and economical electrotinning process. The early electrogalvanizing unit was directly followed by similar units for plating of strip with copper, tin, cadmium and nickel. All of these early installations had some initial success, which was encouraging, but there were fundamental problems which necessitated research in many directions.

Difficulties Encountered

Among the difficulties common to the continuous electroplating of all the coating materials mentioned were those involving: the application of current to the moving strip; cleaning of the strip surface prior to plating; special means of propelling the strip and guiding it through the various tanks; even distribution of the metal coating; and

accurate coordination of the moving strip with the plating current. Even at that early date, these problems were solved in a manner which, although not entirely satisfactory, made the early installations commercially successful, except for the tinning process.

The early electro-tinplate had the following limitations: the coating was too porous to afford sufficient protection for the base metal. The coating was too soft to enable satisfactory drawing or forming, with the result that tin accumulated on the dies or rolls. The tinplate lacked lustre and had a dull matte finish.

Continuous electrotinning of strip steel was proven in principle, however. Subsequent effort was devoted to solving these and other problems common to all continuous strip electroplating processes. It was also the objective to develop a better

TABLE I

Pounds of Tin Coating Per Base Box	Hours Under Test
.48	19.2
.84	63.1
.95	84.2
1.17*	100.0 Plus*

*The test on the 1.17-pound tinplate was discontinued at the end of 100 hours when only 2.6 cubic centimeters of hydrogen were evolved as against the test standard of 5 cubic centimeters.

and more economical tin electrolyte and to perfect/a number of electrotinning processes designed to meet varying conditions and requirements

Results of this 12-year program are summarized here. It is believed that continuous electrotinning of wide steel strip, or plating with ferrous or nonferrous metals or alloys, is now commercially feasible on a large scale, economical basis;

and that it will now proplate and other plated which meet the most exequirements of consuming i

One of the early effor prove the lustre and inc hardness of the coating of brushing the surface o plate with rotary type The mechanical difficultie trolling this operation mendous. The brushes trimmed accurately and a uniform brushing action applied to the surface of otherwise, the tin is en moved from some areas w locations are not sufficiently to give good lustre. The are better appreciated w remembered that the c electrotinplate may be on inch thick. Other diffic volved increased porosit coating, substantial loss of lack of sufficient hardne coating to permit satisfacting or forming of the fir plate.

Hot Oil Bath Fuses

Subsequently, attention rected to heat treating ning strip to melt the tinit to the base metal. This in several ways, including sage of the strip after through a hot oil bath a perature sufficient to fus followed by quick quench fused coating in a cold passing the electrotinplat a furnace having a nonox mosphere for the same and rolling the strip between rolls under nonoxidizing of these, the oil bath prothe most satisfactory and product with little porosity.

Such a fusing operation drawing and forming quareduces porosity. The lais a factor in increasing Fused electrotinplate scussed in the closing article.

bbjective of attaining a erfect product—that is, cally no porosity—reextended into newer the duplex process was ith the idea of electrostrip with nonferrous metal before annealing, with tin, and finally in in an oil bath.

undercoating followed and fusing of the tin, eption of tin as the unproved to be entirely

The products were free from porosity and iant mirror-like finish. was installed on a comis with units for the undercoatings of copd bronze.

a satisfactory product d with respect to porpearance from all three indercoating lines, there in to the use of copper recoating when such time be used for cans continuous to the used for cans continuous. Use of elect, however, appeared enfactory. Subsequent realed that an alloy of ickel was exceptionally as an undercoating ma-

ercoat Unsatisfactory

d, the results were not when tin itself was undercoating material. cause the tin undercoatsubjected to the annealent, combined with the to form an excess of ard tin-iron alloy which inal product unsatisfacawing or forming operan the amount of tin used rcoating was reduced to n-iron alloy, it was found ration for subsequent s made more difficult. as concluded that tin be used as an underaterial in electroplated ade by the duplex proc-

electrolyte that was dethe electrotinplate prociny advantages over the e of baths. It forms no on continuous operation of oxidation of the standts to stannic forms.

pe operated efficiently at trent densities up to 300 r square foot. There is tion or passivity of the ing operation.

will operate at practiper cent anodic and cathncy even at high current

have been made, here

and abroad, to use an alkaline tin bath, but the recommended practice is to use an acid bath because no heating is required for the bath; a lower voltage may be used; and, most important, the speed of deposition of the tin is more than double the alkaline performance for the same cathode current density.

Both soluble and insoluble anodes have been used, but with the proper electrolyte the soluble anode gives a much higher recovery of tin and therefore is the logical commercial practice.

Oil Must Have Stability

During research on oil as a fusing medium for the electrotinplate, it was found that the oil must have stability at fairly high temperatures. Consequently, a special oil base was developed that would be stable in continuous operation at a temperature of 550 degrees Fahr.

This oil has other advantages as it eliminates a fire hazard. Also the tinplate may be stored with traces of the oil on its surface without being discolored.

Despite important improvements made in steel making and rolling, the production of strip inevitably is associated with the inclusion of foreign materials such as oxides into the surface of the sheet. These impurities accentuate the development of porosity, roughness and general lack of uniformity in the finished tinplate. After considerable research, it was found that this obstacle can practically be overcome and a uniform coating of tin ap-

plied by electrolytic methods if the sheets are given a restricted and controlled corrosion over the surface of the strip prior to final cleaning. This process is known as "oxide electrocleaning", and its effect is to break up the skin surface of the steel and remove surface impurities.

More specifically, the strip is passed through a special cleaning bath, which gives it an initial cleaning and puts a blue oxide coating on the strip. This oxide coating is removed by passing the strip through a pickling bath, followed by rotating scrubbers and a water rinse. This leaves the surface chemically clean, which is vitally important in the production of good electrotinplate, and the strip then is ready to pass into the plating tank.

Various tests have been set up to determine the quality of tinplate, the best known of these being the hydrogen evolution method which may be regarded as an effort to evaluate the finished product in relation to actual service conditions. Other tests include those for porosity, namely the Ferracco and hot water tests. By the application of these tests, products of various electrotinning processes may be classified in order of quality as follows:

- Fused electro-tinplate having an electrolytic undercoat of iron-nickel alloy.
- 2. Fused electrotinplate having an electrolytic iron undercoat.

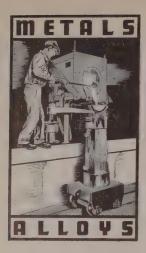
(Please turn to Page 81)

Repairs Broken Necks by Fusion Process

Broken necks of mill rolls, refiner rolls, mixing, crusher and tin mill rolls are repaired by means of α foundry burning technique, devised by Fulton Foundry & Machine Co.. Cleveland. From 2 to 5 tons of Meehanite metal are used for each roll, and fusion is carried out at α temperature slightly higher than melting temperature of the parent metal in the rolls no dividing line is visible after grinding. Shown above is α repaired back refiner roll used in α rubber reclaiming plant.

Broken roll neck is seen in the foreground





Silver Added to 18-8

Small quantities of this element in chromius nickel stainless steels are found to be high effective in overcoming sea water pitting. Le work hardening, improved machinability, high thermal conductivity and better polishing characteristics are other benefits derived

AS a culmination to extensive research on sea water pitting of chromium-nickel stainless steels, discovery has been made that addition of small quantities of silver to the steel imparts a high degree of resistance to this type of corrosion and at the same time benefits certain other important characteristics, such as reducing the work hardening effect, improving machinability and increasing heat conductivity.

A patent on the new steel was issued by the United States patent office, May 2, to the Chemica', Foundation Inc., 654 Madison avenue, New York, which for some time has sponsored experimental work at Massachusetts Institute of Technology, Cambridge, Mass. The patent, No. 2,156,914, was issued to Albert L. Kaye, Robert S. Williams and John Wulff, research workers associated with the institute, and was assigned to the Foundation. Application had been made July 17, 1936. It is the first of a group of patents to be issued as a result of research conducted at the institute and is available for license to American industry.

Field of Application

The invention is claimed to be particularly applicable to stainless steels of the 18-8 type, since it contains about 18 per cent chromium, 8 per cent nickel, the carbon being less than 0.35 per cent; and to equivalent stainless steels in which the nickel is replaced, wholly or in part, by manganese. Such steel strongly resists general surface corrosion and therefore is valuable when exposed to air and water under ordinary atmospheric conditions.

When exposed to sea water, however, stainless steel frequently develops hidden subsurface pits or pockets which may be entirely invisible on the surface or are revealed only by microscopic specks, the remainder of the surface retaining its luster, although the interior may be honeycombed with destructive pits. Formation of such pits, it is explained, takes place rapidly and sometimes with little or no outward signs, so that it creates a dangerous situation.

This type of corrosion is referred to as pit corrosion or pitting to distinguish it from general corrosion, which takes place over large surface areas which are in planes parallel to the original surface, and from intergranular corrosion, which takes place in the immediate vicinity of the grain boundaries of the metal.

Molybdenum Also Useful

Addition of silver, it is stated, is believed to be useful primarily, if not entirely, with chrome-nickel and chrome-manganese steels which do not in general contain amounts of other metals sufficient to change the general characteristics of the steel or to counteract the beneficial effects of the silver. Likewise, the invention is said to be primarily useful with alloys in which its percentages of chromium and nickel or the equivalent approximate 18 and 8, respectively. Silver is the only metal discovered to have the valuable properties when combined, although a combination of molyb-denum and silver affords some unexpectedly favorable consequences.

Presented in the patent are six formulas of analysis which have been found to be particularly effective for certain specific properties; three for resistance to pit corrosion, and one each for free machining properties, high surface polish, and high thermal conductivity. It is pointed out, however, that each analysis has all of the properties indicated to some degree;

also that the remainder is essentially iron, amounts of phosphore silicon, etc., which are rusual in stainless stegeneral type.

The formulas are as

For Resistance to Pit
Formula 1

Carbon, less than

Nickel
Chromium
Silver
Molybdenum
Formula 2
Carbon, less than
Nickel
Chromium
Silver
Molybdenum
Formula 3
Carbon
Nickel
Chromium
Silver
For Free Machining
For Free Machining Formula 4
For Free Machining
For Free Machining I Formula 4 Carbon, less than
For Free Machining Formula 4 Carbon, less than Nickel
For Free Machining Formula 4 Carbon, less than Nickel Chromium Silver
For Free Machining Formula 4 Carbon, less than Nickel Chromium Silver For High Surface
For Free Machining Formula 4 Carbon, less than Nickel Chromium Silver
For Free Machining I Formula 4 Carbon, less than Nickel Chromium Silver For High Surface Formula 5
For Free Machining Formula 4 Carbon, less than Nickel Chromium Silver For High Surface

For High Thermal Con Formula 6

Carbon
Manganese
Nickel
Chromium
Silver

Comparative total tests in acidified ferric lution (a severe pitti for stainless steel of type) have shown that i steel having a compresponding to Formula corrosion produced by of immersion is only a

Back of Every NORTON Wheel ...

RESEARCH Experiments Experiments tests



Industry looks to NORTON Research
to meet new conditions incident to the
new steels and other alloys to be
ground today—looks to Norton for
abrasive developments, bond
developments and improved wheel
manufacturing processes.



NORTON ABRASIVES

Industry Profits by Research

Research is the guiding spirit of modern industry today.

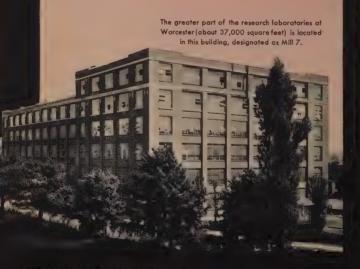
Those who have had an apportunity to visit the Norton Worcester plant have marveled at the research facilities available—the staff of over 50 trained scientists and technicians—the thirteen well equipped laboratories covering such special subjects as analytical chemistry, organic chemistry, physical chemistry, ceramics, mechanics, petrographics, and polishing abrasive development and application.

In the extensive laboratories at the Norton electric furnace plant in Chippawa a large research staff is also constantly at work on new abrasive developments and checking the raw materials used in abrasive manufacture.

The past years have seen many important developments* come from these Norton laboratories. They have solved difficult grinding problems for many — have reduced grinding costs for all. And countless developments of importance are sure to come in the future.

Industry has profited and will continue to profit by Norton research.

*Just to name a few recent ones: optical synthetic resins, diamond wheels including the new metal bond, "I-R" Crystolon abrasive, "B-E" bond, controlled structure, Norbide (Norton boron carbide),













NORTON ABRASI

NORTON COMPANY . WORCESTER, MASSACHUSETTS, U

NEW YORK . CHICAGO

LONDON

CLEVELAND

PITTSBURGH ...

PHILADELPHIA

Porton sharpening stones marketed by BEHR-MANNING DIVISION, TROY, N. Y., menufacturers of abrasive

of a standard 18-8 steel

n observed that pitting tainless steel exposed to f sea water if a portion face is protected from xposure to sea water. e, a ring of pits will d the edge of a barnacle emaining surface of its be unpitted. Likewise, band is placed around steel pipe and the pipe in sea water, pits will in a ring around the nt the edge of the band. able to suppose that the the air or sea water is uded from the covered ile it is freely admitted sed surface and that the ifference in oxygen conproduces a difference of which accelerates the action and the formation

on Is Electrolytic

rides of iron and of chroreadily soluble in sea sequently, as it is formed, e goes into solution and away, leaving the spot ir further formation of id a continuation of the action. As the pit difference in oxygen conbetween the inside of the body of the surrounding itensified and the electrois stimulated.

ven minute amounts of included in the alloy, ed out, the action is quite because the chloride of nsoluble or only slightly sea water and is not disd carried away by the but remains and covers forming an insoluble proting over it. In this rehaves somewhat as does made of copper, which, sed to the air, soon forms adherent protective layer oxide which effectively further oxidation of the

Igly, addition to stainless nall quantities of a metal, ilver is the chief example, ms an insoluble chloride sequently a self-heating film, results in almost protection to the body of Molybdenum has this to some extent, but while thalium also form insoludes their alloying propert render them useful for corrosion resistance of

s completely insoluble in although stated to be solu-10 per cent in chromium g temperatures, it comes out of solution upon solidification, and no effective amount remains in solution. On the other hand, silver makes a solid solution with nickel up to about 4 per cent and with manganese up to about 20 per cent, while nickel and manganese are themselves soluble in iron and chromium in all proportions. Therefore, although silver may be added to an iron-chromium alloy, none will be present in the grain upon cooling, but the added silver will be found to be segregated at the grain boundaries. This is also true of an iron-chromium-copper alloy.

On the other hand, when nickel is present as in 18-8 stainless steel, the silver, being soluble in the nickel-chromium-iron alloy, is in solution throughout the entire grain structure and is not merely segregated at the grain boundaries. Accordingly to obtain the beneficial effects with addition of silver, it seems to be necessary that nickel or manganese shall be present as well to accomplish solution of the silver, and reduce the amount of segregation of silver at the grain boundaries.

These facts are believed to afford an explanation of the singular resistance of chrome-nickel-silver stainless steel to pitting when exposed to sea water. Since the entire surface of the metal—the grain as well as the grain boundary—contain silver, the water insoluble selfhealing film of silver chloride forms over the entire surface of the metal, protecting it, instead of leaving the grains themselves exposed to the electrolytic effect of the sea water if there is a difference of potential due to a difference in oxygen concentration. This continuous self-healing film of chloride covering the entire surface of the metal forms an effective protecting layer which prevents further attack at any point within the area covered by the coating.

Better Thermal Conductivity

In addition to the foregoing primary advantage of employment of silver in combination with other elements of chrome-nickel stainless steel, other advantages of great importance result. The new allov is found to have thermal conductivity which is considerably greater than that of ordinary 18-8 stainless. For instance, tests gave a heat conductivity of stainless steel of a composition corresponding to Formula 6 of 0.053 c. g. s. units per second, whereas tests made with the same apparatus and under the same conditions, of a standard 18-8 steel without silver but otherwise of nearly the same analysis, gave only 0.042 c.g.s. units per second.

It is apparent that stainless alloys containing more than 0.14 per cent

silver would show even a greater increase in thermal conductivity. This increase of 26 per cent or more in the heat conductivity of the improved alloy is regarded as a great advantage, since 18-8 stainless steel as now made is unsatisfactory for use in many places where high heat conductivity is desirable.

It is found also that the new alloy is much less subject to work hardening than ordinary 18-8 stainless steel, which hardens so much as to render machine operations such as filing and sawing extremely difficult. Experience shows, for instance, that a piece of ordinary 18-8 work hardens so much after one or two strokes of a jewelers hacksaw that the saw will not cut it effectively afterwards, while a similar piece of silver alloyed metal may be cut completely through with a single blade. This property, it is claimed, greatly increases the range of usefulness of stainless steel in the arts.

Machining Made Easier

When turned in a lathe, ordinary 18-8 forms a springy continuous chip which is likely to wind itself around the tool or the work and interfere with the machining operation. The alloy containing silver is said to turn in about the same manner as ordinary cold rolled steel.

According to the claim made, stainless steel containing silver can be given a better surface polish than comparable steels and this can be done with much less difficulty. This property enhances the corrosive resistance of the metal, as polishing tends to render the surface of the material more uniform and therefore less susceptible to electrolytic action.

It is regarded as possible that the silver-bearing alloy may have a toxic effect and therefore tend to kill or discourage the growth of water organisms which might otherwise adhere to the surface of the metal and cause areas of different oxygen concentration.

While exact proportions of the several ingredients in a stainless steel incorporating the addition of silver are susceptible of considerable variation, so long as the characteristics of the alloy as a typical stainless steel are not materially changed, it is believed that the most useful and practical proportion ranges of the several elements are substantially as follows: Carbon, not more than 1 per cent; chromium, 6 to 20 per cent; nickel and/ or manganese, 20 to 0.50 per cent; and silver in effective amounts up to 1 per cent in case of nickel and up to 2 per cent in case of manganese, and to which molybdenum may be added up to 4 per cent.

Midget Engines

(Concluded from Page 49)

receptacle top carries a threaded cap which is removed to permit filling with gasoline. Capacity of fuel reservoir is less than 1 ounce, but sufficient to operate the engine for about 8 minutes. Contest flights of model airplanes usually take only about 30 seconds. Thus ample fuel supply is available with no undue weight. In these small planes every gram of weight is an important factor just as in larger planes.

Piston and connecting rod assembly are permanent mold, aluminum alloy castings. Piston is of conventional design with step-type head, two 1/32-inch slots for piston rings, and bosses to support a bronze wristpin. Wall thickness of the piston is slightly over 1/64-inch, and two ½-inch holes are drilled just below the wristpin holes to permit passage of intake gases into the crankcase.

Of the 2-cycle type, engine draws intake gas into crankcase on the upstroke of the piston, compresses it on down stroke. Unfired gas is bypassed into firing chamber as soon as the piston travels past upper ports on bypass side. On the

next upstroke, this gas is compressed and fired when the piston is at top center. On down stroke, burned gases are exhausted as soon as piston moves past the two exhaust ports. This cycle is repeated, with impulses on each stroke.

Lubricant In Gasolene

Connecting rod measures 19/32 inches from hole to hole. Cross section is about 1/8 x 7/64-inch. It will withstand a maximum straight pull of 632 pounds. Hole tolerances are kept within the limits of 0.1255 and 0.1260-inch. A bronze wristpin, 0.001-inch oversize, is press fitted into rod and piston, the latter being heated to insure a good fit. There is no bearing on the lower end of the rod except the softer aluminum alloy on the steel pin. Mixing one part oil with four parts gasoline in the fuel lubricates cylinder walls and bearings.

Piston rings are made specially by a leading piston ring manufacturer. Of cast iron, 1/32-inch in section, they are produced round, then split, placed over a mandrel and heat treated for spring tension, making it necessary to squeeze them together to fit the cylinder barrel

Commutator housing is stamped

from 17ST rolled alumi and is formed with a co fits over boss on front ha case. A fiber post ca breaker point is held through the upper part mutator; other contact to a piece of steel, 4 1/32-inch thick and about long, bent at right ang tached to a short piece steel in such fashion th are held closed except truding end of the afor right-angle piece is lifted volving cam on the shi below it. Advancing or the spark is accomplished movement of entire of housing.

Stamping Used

Cam is a steel stam inch in diameter except 135 degrees of the circumbich is relieved to perform the spark through the points. Cam is %-inch has a square hole so mounted securely on the tion of the crankshaft. tion, cam closes breaker every revolution of the the engine fires with evof the piston.

Spark plug is a most small-size reproduction in every detail, even to gasket, it is known as the lamade by Champion Sco., has 1%-inch thread, overall in length, with Points have a gap of 0.0

These diminutive er shipped fully assembled tested. They may be either upright or invert latter case, gas tank and assembly are rotated hal keep them upright. It ignition coil weighs only The 3-volt dry batteries a used in pencil flashlights

Syncro Devices has being two other types of this design, both somewithan the Bee model described two have been in produced in the some time, approximately ing built last year. The at 1/5-horsepower have and 15/16-inch stroke.

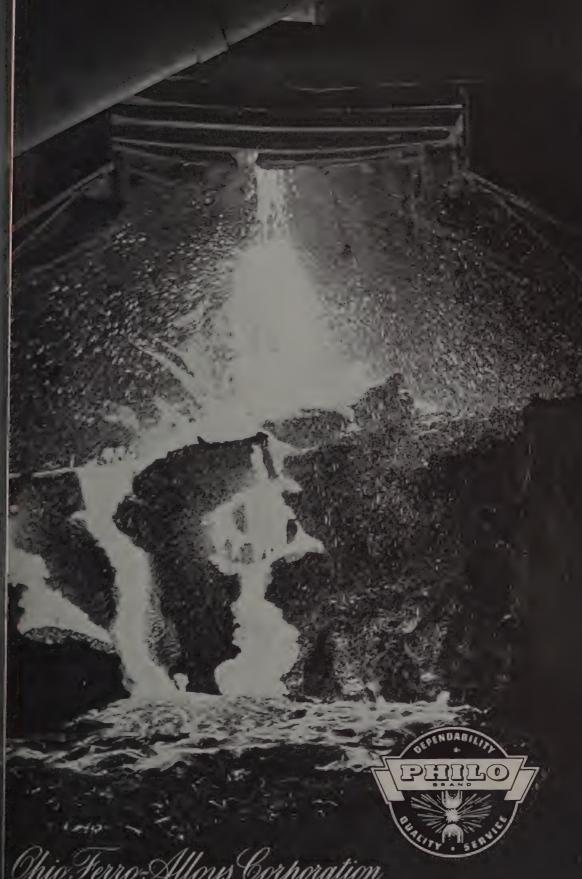
Tolerances in Millionths Of An Inch

■ Gage blocks, of which some 700 sets are used annually in the United States, now are available with chromium plating up to .001-inch thick, thus increasing their life. Elmer Ellstrom, gage block pioneer, (left) inspecting ground and lapped chromium-plated gage blocks with a tolerance of plus or minus 2-millionths of an inch. Other standard tolerances are 4 and 8-millionths of an inch. Photo courtesy Dearborn Gage Co., Detroit

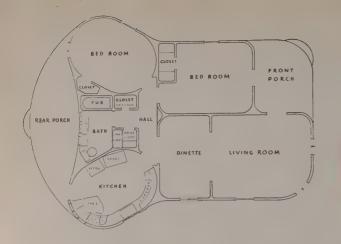


Soaked-Surface E

■ Damp-Tex is a finishing which may be applied over water-soaked surfaces. facturer, Steelcote Mfg Louis, states the enamel lowing, dries dust-free in and is nonsagging. One ficient and one gallon square feet on brick or 450 square feet on wood.



Ohio Ferro-Alloys Corporation Canton, Ohio



onstructing Low

This 5-room house is ultra-modern inside and out, rooms being elliptical in shape. Features are a welded steel frame, steel lath, steel doors and window frames, and steel cabinets and shelving. It is fire, sound, heat, termite and earthquake proof, and is air conditioned. At the right is a model of the house on display at the Golden Gate exposition; the floor plan is reproduced above

■ CHALLENGING present construction methods, a newly-designed welded steel frame house, now being erected in various California cities, is demonstrating the superiority of steel in modern home building.

Designed by B. J. Compton, Bakersfield, Calif., contractor, this type of house was first built in Central California, but the intensely hot days and quick cooling nights of this area proved sheet steel to be unsuitable as the principal construction material. Consequently, Compton set about to design a steelframe house, the walls of which would offer complete insulation to heat and yet would not crack or buckle with rapid changes in temperature. The result was the present ultra-modern structure that is comfortable, economical and practically indestructible.

Not a single stick of wood, screw, bolt nor rivet is used. Floors are of suspended concrete. All structural members for the pumiceous stucco exterior walls, plaster double interior walls and concrete roof are of welded steel. Doors and window frames also are steel welded; even closet shelves are of steel, welded to steel wall studs. Streamlined inside and out, the dwelling has elliptically-shaped rooms with all corners rounded. Although unique, both in design and construction, all innovations are based on utility. The resulting structure is a building that is not only fire, sound, heat and termite-proof, but resistant to floods, earthquakes and time.

The suspended concrete floor is made with light-weight aggregates of inert materials. Rock and powdered pumice may be built into a strength of 2000 pounds with a weight of 82 pounds per cubic foot.

Resting on exterior walls and internal dwarf walls, the floor, reinforced by steel bars in mat formation, has no span over 12 feet. Not even in forming these walls is wood used, for with their curved contour, steel forms tied together with angle clips have been found more economical.

Trusses Field Fabricated

Steel bowstring trusses, the cord of angle and the arc of T-rail, are fabricated in the field with an angle roll. One-inch angle is welded to the cord of the arc for the secondary member. With the proper set-up, two men-a welder and a finishercan turn out one truss per hour. All joints are arc welded, each truss requiring 30 welds. Twenty trusses for the five-room dwelling vary in span from 18 feet 5 inches to 35 feet 3 inches. Because of the strength of the steel support, with the use of curved surfaces, the steel requirements average only 1 ton per room, as against 11/2 tons without the arc. Twenty bowstring trusses; 880 feet of ¾-inch steel out the arc. angle for secondary members of trusses; 350 wall studs; 38 ¼-inch round X-braces; 5/16-inch furring; 75 anchor plates, and 710 feet of bullnozing, are some of the major steel requirements. All steel is of

standard sizes and machased anywhere.

The roof is formed pumiceous cement over with sound insulatin wired to the under side. The truss is designed load of 80 pounds per without any partition of ferent height trusses, hand tapering to the reroof its streamlined. For exterior trim effishingles may be nailed cement roof.

The lower cords of trusses serve as ceiling which metal lath is wiffered into through the concrete insulating material is proof the lath and between lath and the lower of trusses. As in the warpumiceous mixture is ceiling for its sound de noncracking qualities.

Duplicate steel studs support the outside fin inside plaster in the corthe walls, which are proof. The steel angle welded to flat bars nato the soft pumice ce Double walls of a plast

nlined Steel Houses in California

or the exterior and %interior with a 4-inch
led between are formed
nately 300 1½ x 1½ x
e studs welded to the
Throughout the strucof 250 to 300 welded tie
sed. The welded steel
to only permanent duraction but light flexible
by using studs with a
of sufficient flexibility
th, plaster cracking is

are spaced 16 inches all window frames are a 16 inches, thus making to change window locag the building without g expensive structural late glass windows are sash. To eliminate sun class is set at an angleoottom and in at the top. dard design, windows are ottom sill being only 18 the floor. Steel window welded in place and tied together by pieces lat. Seven sliding metal ree curved and four litting within the walls , are hung on noiseless runways.

nded corners of rooms ost space and the traps nd dust made by right angles. They also offer a practical adaptation of the house to the fundamental laws of air conditioning and heating. Air conditioning is achieved through slots beneath each window, the air being filtered through sponge-type coil radiators located in the wall and connected directly to a hot water booster neater. Surplus heat and smoky or foul air are taken care of by ceiling breathing vents leading to one common stack.

In addition to closet shelves, bathroom cabinet and kitchen cupboards
also are of steel. A steel cabinet
sink is used in the kitchen. An
economical feature of the doublewall construction is the ease with
which plumbing can be roughed in
between the separated walls. All
plumbing is accessible until interior
walls are plastered. Copper tubing
is used for the water lines and for
the air conditioning system.

Principal labor item in the construction of this new house is steel work and welding. Welding starts

Shown here is the framework for the welded steel house in process of erection. Steel requirements are 1 ton per room and the material is fabricated at the site. More than 2000 welds averaging 2 inches are made. Cost of the 5-room house is less than \$1000 a room

as soon as the floor is set and continues without interruption until the frame work is complete. Some 5 tons of steel and 100 pounds of welding rod go into the building, which requires more than 2000 separate welds averaging 2 inches.

Cost of the standard five-room house is less than \$1000 per room. Considering the permanent character of the construction, the smart design and the many modern features, including complete cold, head and sound insulation, absolute fire protection and an air conditioning system, the price is low. Furthermore, the house combines low maintenance cost, low insurance rate and minimum obsolescence. Thus, actual expense, including upkeep over a period of years, promises to be below most houses furnishing similar interior comfort.

The degree of flexibility of design under this new type of construction depends upon the receptivity of the architect. Certainly, the architect is not greatly limited as to the front elevation. In fact, he has practically a free hand in design, but structurally he must conform to the cardinal principles—steel in place of wood; curved surfaces for strength and lightness; inert materials for aggregates; double walls; and the use of welding instead of nailing.





Taps and Dies

Latest developments in testing equipment, building design, heating furnaces and accessories
with a centralized automatic controlling and
recording system, permits meeting exacting
specifications, assures efficient operation of department, fixes responsibility and lowers maintenance costs

By N. F. MURPHY

Engineer Foxboro Co. Foxboro, Mass.

■ AT THE plant of Winter Bros. Co., Wrentham, Mass., the wide use of improved carbon alloy and high-speed tool steels has necessitated increased precision in manufacture of taps and dies. Use of alloys with tungsten, vanadium, cobalt, molybdenum and other elements has accentuated the importance of correct heat treating. To meet critical specifications in this plant, definite heat treating schedules with suitable furnaces and temperature-controlling instruments are employed.

To assure most efficient heat treating, full advantage has been taken of modern building design, up-to-date heating furnaces and accessories, centralized automatic temperature controlling and recording equipment and latest developments in testing and inspection apparatus.

The heat treating room is laid out for easy flow of material through the department. Arrangement of equipment is compact, yet a wide area of cleared space is available. The brick and steel building housing the heat treating department is $90 \times 50 \times 18$ feet high at the eaves. Six ventilators run through center of the building. Natural light from 1150 square feet of glass supplemented by light modern indirect lighting fixtures assures proper illumination at all times.

Unit heaters overhead afford efficient heating when required. Water, steam, gas and oil mains are laid under the concrete floor in trenches covered by steel floor plates. An adequate system of blowers and ducts takes care of all fumes and smoke as well as constantly bringing in a sufficient volume of clean, fresh air.

Hardening, annealing and tempering furnaces with their quenching tanks and other equipment used for carbon alloy steel taps and dies are located on the east side of the room. Temperature control-

ling and recording pyrome this section are centralize enclosed panelboard at the west wall. Furnaces and quanks used in high-speed stare arranged on the west the room with their control recording instruments also ized.

Thus, a broad aisle between two rows of equipment segregate the handling of alloy cteel and high-speed sopen area faces large foldiwhich permit access to the motor trucks can load an within the building. An trolley hoist facilitates eadling of heavy equipment

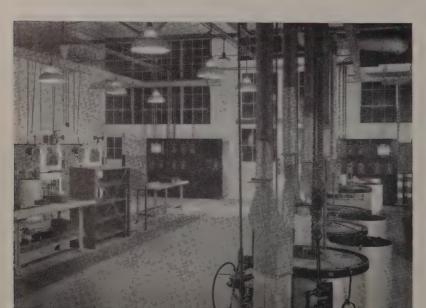
City Gas Used

Fuel used is city gas of content. Gas lines are equip safety locking-type valve shut off supply to all fur case of electric power failuterruption. Valves must manually for resumption ice. This eliminates any dbackfire and assures safe of furnaces.

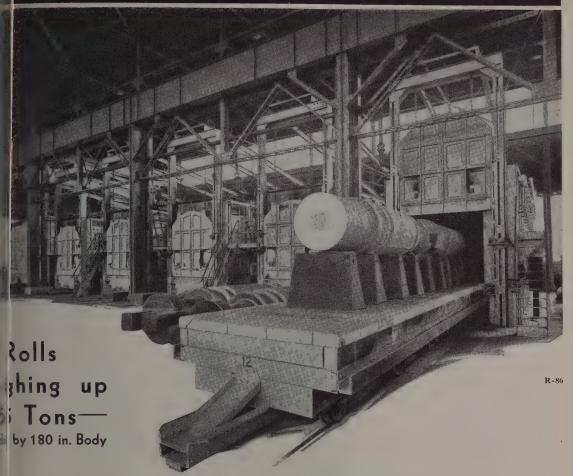
Equipment for heat trea nary carbon steel inclubaths and salt baths of types. The pot-type furn tangentially fired, equipt tunnel-type burners and doperation. Fumes from all lead baths are exhausted ventilating systems.

Equipment for high-spe taps and dies includes furnaces underfired with tw burners and completely

General view of heat treating ment. Note high ceiling, largarea, efficient lighting, wide efficient arrangement of eq



ED USES B & W INSULATING FIREBRICK



Economically Heat-Treated

Six Car-Bottom Annealing Furnaces at United Engineering and Foundry Company, Vandergrift, Pa. Lined with B&W Insulating Firebrick. Designed and built by George Naismith and Son, Pittsburgh, Pa.

Significant Facts

modern furnaces are natural gas fired; re built in 1936 and 1937. Furnaces ins (inside): Three are 7 ft. wide by 38 ft. re are 7 ft. wide by 42 ft. long; one is 16 ft. re are 7 ft. high car-top to skew struction: side and end walls 13½ in. B&W Firebrick plus 1½ in. insulating block; doors, 9 in. B&W Insulating Firebrick

B&W Insulating Firebrick have helped to save fuel, reduce annealing time and speed up production. Due to their high insulating value, a very uniform temperature is maintained throughout each furnace.

Bulletin R-2-F gladly sent upon request.

BCOCK & WILCOX COMPANY... Refractories Div.... 19 Rector St., New York, N. Y.

ABCOCK & WILCOX

These furnaces are equipped with atmosphere control.

All quenching baths employ oil which is contained in tanks with round corners and located adjacent to furnaces. Oil is circulated to tanks from a large underground storage tank outside the building. Each tank can be drained easily by simply operating a drain valve.

An individual, potentiometer, automatic, temperature controller regulates the fuel flow to each furnace burner system by means of a 2-position motor-operated valve. Single valve control of the air to each proportional mixer assures correct air-gas ratio for proper combustion. Accurate temperature measurement and positive control is essential in tap and die work. To assure maintenance of a definite temperaturetime cycle schedule, potentiometertype controllers with no "dead spot" in the controlling mechanism are used in conjunction with accurate timer clocks.

Instrument Panels Enclosed

Instruments for the carbon-steel furnaces are grouped together on a steel panel. Controllers and recorders are mounted flush, and the panels themselves are enclosed. This method of installation protects the instruments from accidental mechanical and electrical damage, facilitates checking and maintenance service, permits definite supervision of operations and

presents an appearance in keeping with the general, clean-cut surroundings. Instruments for the high-speed steel furnaces are centralized near-by on a similar papel

by on a similar panel.

Controllers for use at temperatures under 2000 degrees Fahr. are calibrated for chromel-alumel thermocouples. Platinum-type thermocouples and controllers are used for the 2400-degree temperature ranges. Each controller has three mercury switch contacts which actuate the motor-operated valves and which close circuits to the signal lights.

Signal Lights on Furnace

A set of three signal lights, colored white, green and red, is installed at each furnace. These lights indicate whether furnace is operating above, below or at the temperature desired. They assist the operator in maintaining correct treatment schedule.

Separate, multiple point, potentiometer, strip-chart type recorders are connected to thermocouples in the tempering furnaces to provide a permanent temperature record of each load placed in the baths. Use of separate controlling and recording instruments on this important operation gives a continuous check on all equipment operation also.

A portable indicating pyrometer is used periodically to check thermocouples in service. Spare thermocouple assemblies permit replacement to be made without ing furnace operation.

To provide for future to present equipment, probeen made in spacing of and instruments. Presisteam, gas and oil supply are sufficient for any instruments.

Work heat treated con types of dies and taps, clude many special des treating standards are s checked by the laboratory of heat treating departs allurgist and his assista sponsible for proper heat during production. All we treated on a temperature established by the labora

Taps and dies are I batches of various quantifinear the furnaces until are ready to handle the steel work is put into lebaths and quenched after for a definite time at the mined temperature.

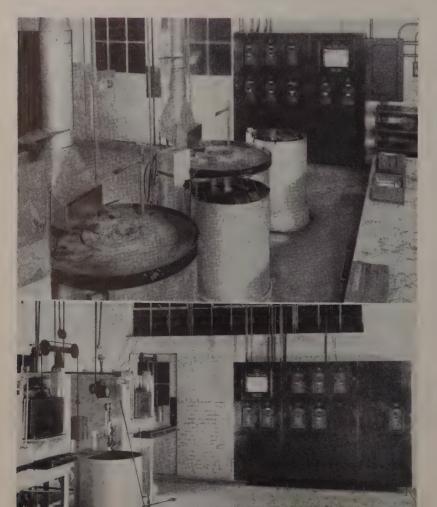
High-Speed Steel Pre

High-speed steel is pl preheat furnace for a length of time and then to to a high-heat furnace for period with temperature a phere being controlled After this, it is rem quenched in oil. Subseq pering of all high-speed done in salt baths under trol of time and temperat

Cleaning and straighter tions are carried on in building. All pieces received in the lot finds its way to tion and research laborat are checked carefully for and toughness and prographs are taken to restructures. Precise dimeasurements are made testing under actual work tions checks quality and characteristics. Thus, all is eliminated, and a high uniformity attained.

Since installation of the heat treating department dividends have been obtained form of reduced number lower maintenance cost working conditions. Also portant temperatures accorded, it is possible to sponsibility of proper ment and to assure that schedules are carefully for

Upper, part of row of lea pots with centralized contro down length of room. Lov of high-speed furnace a equipment which occupie side of department



AINLESS STEEL SPRING WIRE



Wissco Stainless Steel Spring Wire has established an entirely new service standard for springs exposed to moisture, live steam, acids and alkalies. It possesses all the "life" of the best conventional ferrous spring wire, has

corrosion resistance equal to all and better than most non-ferrous spring wires, yet takes longer to "set". Many periodic spring replacements that were considered trade nuisances are no longer tolerated. Consider what spring failure means to you. Add the cost of springs and installation to the loss from interrupted service. We will gladly give you the story of savings of Wissco Stainless Steel Spring Wire.

WICKWIRE SPENCER STEEL COMPANY

500 Fifth Ave., New York; Buffalo, Chicago, Detroit, Worcester. Pacific Coast Head-quarters: San Francisco. Warehouses: Los Angeles, Seattle. Export Sales Dept.: New York

Aparters a mission restrict state of the Carter Witner in various vide at "titules for your spendic purpose Hard Drawn, which is, close the steemer Wires — Hard-Drawn annealed, or oil-tempered to, Chrome Vanadisum Spring Wire — Velve Spring — Music Harsan Howand Eye Recom Stapling Booken doing Denties for the Wire Chief Princer Needle Bar Scrime Stock adding Denties for the Wire Chief Princer Needle Bar Scrime Stock adding Bruth — Card - Florist — Mattress - Shapad — Rope — Welders and Strip Steel - Cornection and Hear Resistanting Wires Consult feeling of the Consult











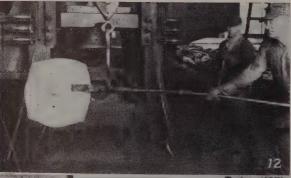




_ 3 _

-- 4 -

_ 5 _

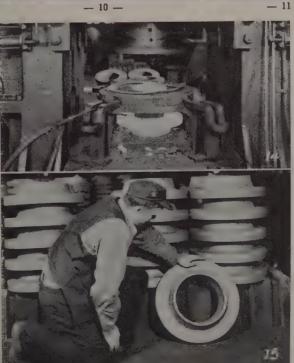




■ Steps in drop forging of pipe flanges at of Crane Co. are as follows: Fig. 1, cutting to 4½-inch steel billets into slabs 14 inches say slab is being placed in gas-fired heating furner at 2800 degrees Fahr. Steam drop hammer, Fig. weight without dies of 22,000 pounds, dies 3500 pounds. With 100-pounds-per-inch steam pact die-to-die is 8,300,000 foot pounds. Maxis 26.6 feet per second. First 6 feet of 30-foot der hammer consists of 12 x 12-inch timber cushion. Remainder is block of concrete. Cylinder bore is 30 inches; stroke, 52 inches forging is to place disk of cold steel on hot



through the steel easily. Here removed disk de of anvil. Fig. 6 shows hammer in action. Fig. 7 shows with air gun, second swings oil-soaked upper die, third operates furnace and trim-Remarkable series of photos, Figs. 7, 8, 9, 10, essive stages in forging operation. In Fig. 12, wed from hammer by tongs suspended from a mair hoist and moved to trimming press. It flange partly trimmed, Fig. 14 completely ished flanges are shown in Fig. 15. These are ready for heat treating and machining





Vibratory Feeder

■ Syntron Co., Homer City, Pa., announces model "F·O" vibratory feeder, with no moving or wearing parts, for controlling flow of bulk solids. Rated at a capacity of 2000 pounds per hour of 100-pound ma-



terial such as sand, this model is intended for small, finely controlled feeds of down to a few pounds per hour, such as is required to feed chemical reagents, articles to inspection belts, material to automatic weighing machines, etc. Unit is made of a sheet metal trough 18 inches long by 3 inches wide, with tapered sides from rear to front, mounted on springs and actuated by a pulsating electromagnet. Finger tip control of rate of flow is accomplished by regulating vibratory action through a rheostat in controller, which also contains operating switch.

Interlocking Junction

■ Ohio Brass Co., Mansfield, O., has developed type B interlocking



junction in steel case for making direct-current trailing cable connections with power off. Quick-break switch is interlocked with case so case cannot be opened and connections cannot be made with power on. Hand grips on trailing cables have three split phosphor bronze plugs so arranged that plugs cannot be inserted in wrong circuit. Unit is mounted on moisture-proof insulating panel.

Ratio Counting Scale

■ The Exact Weight Scale Co., Columbus, O., offers visible ratio counting scale for predetermined counting and counting an unknown



quantity. A few pieces of material are placed in ratio pan and remainder on scale. Pan is balanced on beam, and indicator shows by direct reading number of pieces on scale. For predetermined counting, pan with required amount is set on beam to give required reading, and scale is loaded until pan balances.

Portable Blower

■ The Breuer Electric Mfg. Co., 5100 North Ravenswood avenue, Chicago, announces that waterlift or its 1 horsepower portable electric blower has been raised from 46¼ to 52 inches, with proportionate in-



crease on three smaller models. Units are equipped with double grease seal ball bearing and double-curved extension handle for floor cleaning.

Pillow Blocks

■ Ahlberg Bearing Co., 3025 West Forty-seventh street, Chicago, offer Series ED ball bearing pillow blocks with single row bearing in die-cast housing. Ball bearing is assembled to provide for shaft deflection and misalignment up to 1 degree. Seals are of floating construction, eliminating friction and increasing life of both seals and



bearing. Seals are of synthetic rubber which fected by oil or grease shaft sizes are ½, %, 1½ and 13/16-inches.

Forges Mine Bits

■ L. M. Brown, Inc., Pa., announces a ma forges high-alloy steel said to cut four to eight many lineal feet of coaing as carbon steel bits may be redressed 120 to Unit comes complete with machine integrated wifurnace so passage of furnace is co-ordinated.



with action of machine controls forging action. oil-fired by fuel-oil pu constructed of carborun tory brick, nonspalling brick and Armstrong brick.

High-Speed Press

■ Charles F. Elmes Works, 230 North Mor



rs high-speed hydrauh extremely sensitive
control features. Stroke
of moving platen is
four adjustable gibs.
be lowered a fraction
t a time. Bed is arashioned cylinder. All
s are pressure lubriinating lamps are innings in two side hous-

and Control

eveloped recorders and using glass electrode measurement in wide and round-chart models. plugged into any standircuit, fluctuations in being automatically for. Shielded glass



rl electrodes are used.
are either enclosed olution under measuremped or allowed to flow amber) or immersion in led for immersion in led. They can be used or even semi-solid subin rapidly circulating liquids.

urbines

ouse Electric & Mfg.
Pittsburgh, Pa., offers
steam turbines ranging
2000 horsepower, 100 to



utions per minute for sures to 650 pounds, temo 750 degrees Fahr., exsures to 200 pounds, vacuinches of mercury and pressures to 200 pounds. ns of basic design provide for condensing, condensing extraction, noncondensing, noncondensing extraction or mixed pressure service.

Four-Corner Compressor

■ Ingersoll-Rand Co., Phillipsburg, N. J., has redesigned its 4-cylinder direct-connected synchronous-motordriven compressors of 700 to 3000 horsepower. Four-corner construc-



tion of two low and two high-pressure cylinders having a single motor and crankshaft has been retained. Turret-type channel valve and simplified arrangement of cylinders and intercoolers are incorporated.

Toggle Clamp

■ Detroit Stamping Co., 3429 Fort street, West Detroit, Michigan, has announced De-Sta-Co toggle clamp with built-in air cylinder. Attached to air line and operated with a Ross air control valve, unit suits fixtures difficult of access or requiring mul-



tiple clamping operations wherein one air valve can be made to control and operate several clamps.

Flight Conveyor

Moline Malleable Iron Co., St. Charles, Ill., has built a flight conveyor with long link chain which is in tension rather than in shear when loaded, and thus permits use over long "centers." Throat section of arm has two thick walled pockets, two half or "loop" links with shouldered ends fitting into pockets and a key and cotter pin that hold loop links in place. Loop links are available with various "pitches" to coincide exactly with pitch of chain being used. Conveyors operate in a trough, either horizontally or at inclines up to 55 degrees, and differ from other conveyors in that long link chain is connected into and supported



from flights rather than requiring flight to be fastened on chain. Discharge is made either over headpulley or through gates in bottom of trough.

Electric Control Valve

■ Wheelco Instruments Co., 1929 South Halsted street, Chicago, has developed a self-contained electric control valve for throttling gas, oil or air flow to furnaces, ovens, etc. Combining valve and operator in a totally enclosed unit, electro-thermal expansion principle of electric valve operates without mechanical movement other than expansion and con-



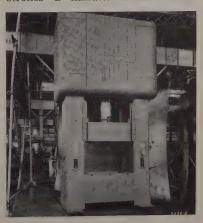
traction of enclosed operating cylinder. Tapered response curve minimizes hunting.

Files Stainless Steel

■ Nicholson File Co., Providence, R. I., has on the market a file for dense metals as stainless and other alloy steels. Properly used with a light pressure and slow, steady stroke, it lasts much longer than general purpose files on alloy steels.

500-Ton Hydraulic Press

■ Baldwin-Southwark Corp., Eddystone, Pa., offers 500-ton hydraulic presses making 22 short working strokes a minute. Presses have



adjustable stripper in moving down platen and full stroke of 20 inches. Platen area is 48 by 41 inches. Presses can be operated manually, semi-automatically or completely automatically. They are of self-contained, oil operated type. Side housings are of cast steel. Pump, motor and valves, located on top of press, are readily accessible.

Welds Stainless Steel

■ The Lincoln Electric Co., 12818 Coit road, Cleveland, announces an arc welding electrode of 18-8 type having 3½ per cent molybdenum and called "Stainweld" C for welding stainless steels. Coating on

ABRASIVE COMPANY SNAG-GING WHEELS means increased production and lower costs in

cleaning castings and billets.

electrode prevents oxidation of weld metal. Electrode is made in $\frac{1}{2}$, 5/32 and 3/16-inch lengths and sold in 25-pound packages.

Cellulose Sweat Pad

■ American Allsafe Co., Buffalo, N. Y., offers Drybrow sweat pad of fine-pore cellulose sponge bound at ends with tape and equipped with one-piece latex rubber headband. Absorbing 20 times its weight in moisture, it prevents perspiration from trickling into eyes or onto goggles. Preliminary moistening in water provides cooling application and lengthens life of the material. Pad resists chemical action of perspira-

tion and can be washed soap and water and s boiling without affecting durability.

Name-Plate Stan

developed deep throat stamping machine mawithin a space 4½ by sholding plates 8 by 8 standard table. Up and justment for thickness plates is ½-inch, and disback of throat to face 8 inches. Standard No. is available with integrand replaceable dies if from 1/16 to 3/16-inch.

Diaphragm Com

The Electric Sprayi North Broadway, Milwat troduced its Series 20 power, nonvibrating diap pressors with sprayin over 30 pounds. Diap last over 400 hours. Pop included.

Self-Cleaning Fil

S. F. Bowser & Co. Wayne, Ind., has anno 823 automatic self-cleani lubricating oils, coolants



elements are available porosities depending up filtration desired, and each size can be increation of individual filter eto six). High speed erates in bath of lubrica abrasive material from not reach it.

Band Saw Packa

Continental Machine Washington avenue sou



floor stand grinders... consisting of two circular steel flanges or plates embedded into the wheel around the center hole . . . provides better fit, truer running, less wear, etc. No extra charge. Write for details.

ABRASIVE COMPANY

Division of Simonds Saw and Steel Co.

Tacony and Fraley Sts., Philadelphia, Pa.

Chicago Branch: 1624 South Western Avenue.

A new patented feature for resinoid

bonded wheels for swing frame and

loped Doall precision ith an opening in one permits stripping of length from box, keep-intact. Carton holds of saw blade. Cellored window shows ining. Three hundred by blade band saw are

Hand Grinder

Wolf Machine Co., Cinlight-weight, portable perating directly from



ver line. Motor is to-Castings are of high num alloy with steel ing bearing seats. is safety feature, and sion cord is attached. ed that unit can be out any suspension for without fatigue.

Hammer

Decker Mfg. Co., Towi's redesigned its No. 34 tric hammer. Tool is i'l unit powered by uniier which requires no equipment. Hammer sefinite "follow through" mer weighs 17 pounds, 00 blows per minute apacity in concrete or inches.

ame Grinder

B. Shuster Co., New i., has developed motorended type swing-frame heavy grinding work if up steel billets, etc. in three sizes ranging



inches to 24 x 3 inches. by swiveling yoke and ng through a complete ilted 90 degrees to the Unit may be locked at tilt. Smallest unit has ch centers and overall x 22 inches including

r Mounting

se Air Brush Co. Inc., enue, Newark, N. J., has nting for Pneumix airitators for direct drive has variable speeds (30 to 6000 revolutions per minute). Laterally swinging cross arm holding air motor with direct drive shaft and propeller is adjustable up and down a vertical bar and can be fixed at any height.

Bearings Resist Acids

■ Gatke Corp., 228 North La Salle street, Chicago, makes bearings and rollers of nonmetallic materials that resist acids and organic solutions for use in pickling tanks for steel and nonferrous metals, agitators in mash tanks and steam cookers of distilleries and breweries, etc. Illustration shows roller and bearing assembly after 11 months service in



an electrolytic pickling tank submerged in acid and subjected to combined effect of hot, dilute sulphuric acid, iron sulfate, electrolytic action, mechanical wear and shock. Pickling acid was the only bearing lubrication.



SIMONDS FAMOUS FAMILY OF

METAL CUTTING
TOOLS

RED TANG

The new FILES with improved shaped teeth that cut like a Metal Saw.

Sold by

MILL SUPPLY DEALERS

Red Color on the Tang of a file is a registered trademark.

-A guarantee of High Quality.

European Automotive Experts See Detroit Factories; Hear Papers

■ SCENE of the World Automotive Engineering congress, sponsored by the Society of Automotive Engineers, shifted to Detroit on May 31 when a large delegation of distinguished European engineers arrived in that city to participate in a three-day program of plant visitations and meetings. The group had attended sessions in New York, May 22-28 (Steel, May 29, p. 64, and June 5, p. 66), then journeyed to Indianapolis, May 30 for the 500-mile automobile race. From Detroit, the party moved on to San Francisco for concluding sessions, June 6-8.

The program in Detroit embraced a visit to the Ford plant on May 31; visits to several Chrysler plants on June 1; an inspection trip to General Motors proving ground at Milford, Mich., on June 2, where a technical session was held in the afternoon; and a banquet at Hotel Statler that evening. W. S. Knudsen, president, General Motors Corp., was principal speaker at the banquet.

"Looking to the future in motor cars," Mr. Knudsen declared, "it is probably correct to assume that generally performance is out ahead of the field and that economy, comfort and safety are factors requiring first attention.

Foresees Lighter Engines

"Rapid development of chassis and body construction has left these units more or less stereotyped with exception of the front system, on which individual springing today is generally accepted. What can be done on the engine nobody knows. We seem to be about stationary at 5 pounds plus per horsepower and manufacturing technique has produced this kind of motor at reasonable cost. However, when you compare aviation engines at 11/2 pounds per horsepower, there would seem to be room for progress in the smaller engines-not to 11/2 pounds, of course, but say to 41/2 pounds.

"Transmissions show a definite trend toward overdrive, both automatic and manual, and the fluid flywheel is just a question of cost. Engines in the rear seem to have reached an impasse for the moment, but the independently sprung rear axle is surely in the picture in the not too distant future. In the bodyframe combination, there lies the greatest possibility for weight and cost saving. It would seem that some way could be found to combine body underpan with the frame in one piece and accomplish substantial weight saving without any

great sacrifice in structural strength. With the progress made in welding processing, this would seem a reasonable assumption," Mr. Knudsen said.

Two papers were presented at the technical session at the proving ground. E. F. Davis, chief metallurgist, Warner Gear division, Borg-Warner Corp., Muncie, Ind., reviewed new developments in heat treating methods, materials and processes; and Enrique Touceda, consulting engineer, and J. H. Lansing, shop practice engineer, Malleable Founders' society, Cleveland, discussed developments in malleable iron practices and their automotive applications.

First discussing recent improvements effected by steel mills, Mr. Davis examined in considerable detail various types of new steel analyses and treatments; then proceeded to elaborate on new types of heat treating furnaces. Quoting in part from his remarks, he stated:

"Of recent years there has been increased trend toward employment of fine-grained steels and a demand on steel mills for grain control. Certain types are normally fine grained, such as the chrome-vanadium steels, whereas others are normally coarse. But to make the majority of the alloy steels coarse or fine grained to demand, is a recent accomplishment.

"In both carbon and alloy steels of fine-grain microstructure the problem of machining has been a difficult one where smoothly machined surfaces are prerequisite, such as gear teeth. To improve this condition attempts are being made to introduce other elements into steel to compensate for fineness of grain and inherently stringy characteristics.

Better Machinability Sought

"Many of the rarer elements have been tried and some have shown promise but elements such as zirconium, selenium, columbium and uranium are prohibitive additions for production steels although some of these are used in the 18-8 stainless steels and have proved aids to machining properties. Zirconium in small quantities has been found beneficial in improving machinability in the higher manganese steels. An important contribution to this problem came out of the steel containing lead.

"To improve physical properties by elimination of oxides nitrogen and other gases and to promote coalescence of inclusions, several new deoxidizers are bein
"Composition of the
ers is not of general ine
as they indicate the
amount of work that is
to improve steel quality

"In many automobile trend has been toward ch Several have almost en nated use of alloy stee substituted what migh the deluxe high-manga steels made with specia, These steels vary from per cent manganese corre the S.A.E. 1300 series manganese steels are ment over the older ty the actual chemistry of has not been greatly mo transmission and rear are being fabricated steels. Their success re rate control of grain size bility and physical pro

"Heat treatment of st progressed equally to t ment in steel metallur portant contribution to a treatment practice has a ternally-heated pot furna ening in cyanide and baths.

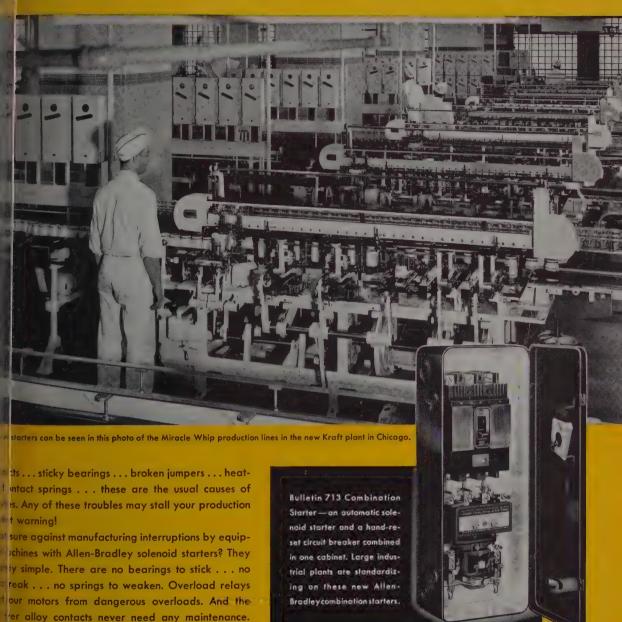
New Gas Carburizin

"Gas carburizing is finroads into the box oburizing process. Altho a carburizing medium yet the modern gas carb is distinctly new. Unlike signs these are complete ing units which will at carburize, quench, wash. These newest installati are found in the larger plants where frequently are in operation and what steady flow of parts.

"Actual cost of carbu gas is so low to be air ble. But the high expenthe large amount of allo for operation including tures and particularly which in the larger uni 40 feet long made up of tions and costing from \$7500 each. If a life of a ly 12,000 heat-hours is cellent economy is poss frequent renewals of necessary it might pr pensive method of carb loy manufacturers have the necessity for sour both the furnace builder of these units have be ing these be given an amination before accepta

"To combat the high loy muffles there is one in a General Motors plan where no alloy muffle but instead the carburber is made of firebri

JR PRODUCTION LINES inst needless shutdowns



ALLEN-BRADLEY SOLENOID MOTOR CONTROL

1-Bradley solenoid starters . . . and play safe!

HOW KRAFT automatically controls the motors in their new Chicago p You will find Allen-Bradley solenoid starters and control stations on all of the important production lin international headquarters building of the Kraft-P Corporation, in Chicago. These Allen-Bradley sta modern and efficient as every other part of this fir They were selected on their record of performa Kraft plants. Specify Allen-Bradley control for

THE SOLENOID STARTER"

HLLEN-BRANCEY

Allen-Bradley Company 1320 S. Second Street Milwaukee, Wisconsin

Please send me "The Story of the Solenoid Starter.

lity......Sto

ALLEN-BRADL SOLENOID MOTOR CON

QUALITY

dom from iron. Prior had shown that such ild have no unfavorable h furnace gases. The heated by a series of ourners which inject 14 cylinders about 12 ameter and 5 feet long ith flues at the bottom ce. The chamber, which feet long, is heated by e from these heated

pushed on skid rails over the radiant cyling of the radiant cylinhe work with the colder was for the purpose of a cycloidal flow of the gas.

ace has been in opera-1/2 years and is the first without an alloy muffle. is given a good account ne of its features is the radiant cylinders may In event of a leakage taken out and replaced nours without seriously oduction. A muffle failother hand, would neveral weeks delay for ren addition to high cost. nent of radiant heating crease. It is particularly irnaces where the prodbe injured by contact stion gases such as vitbeling and where atmosemployed to protect the leated metal.

se of Radiant Tubes

tubes are used in many ypes of furnaces. Sheet aling perhaps leads the ey are also employed in ning furnaces, bar heat rnaces, galvanizing pots netal melting. A recent has been for malleable ding in both stationary uous types."

ig Mr. Davis' paper, R. J. stallurgist, Surface Comrp., Toledo, O., said that viewpoint of a producer eating equipment, it apsignificant advancements eating may be classified ain divisions as follows: ation of special atmoshmechanization of furcase hardening by gases, diant tube heating.

ew reveals the great hat have taken place in re of industrial furnaces, led. From piles of brick w burners inserted, furbeen developed into speat treating machines of the mechanical excellence. elopment has depended of heat-resisting alloys of types and special refracd insulating materials. Along with these have come improved methods for burning gases and various new types of muffle construction.

W. A. Darrow, Continental Industrial Engineers, Chicago, cited as his opinion that there are three schools of thought with respect to gas carburizing; one believes in coating the product with soot which is burned off before the part emerges from the furnace; a second controls the amount of carbon deposit on the product by addition on inert gases to the furnace atmosphere; and the third believes in producing no carbon deposit, preferring to keep the diluent gas in the furnace hotter than the metal, then to add a controlled amount of carburizing gas at the hottest point in the furnace. With reference to the mechanism of carburization, he advanced the suggestion that it perhaps proceeded from the formation of iron carbonyl in the furnace.

Alloy Steels May Return

O. W. McMullan, Youngstown Sheet & Tube Co., Chicago, observed that advances in heat treating methods and equipment had improved the position of the carbon steels and low-alloy steels for use in automotive parts. He added that possibly in the future will come a swing back to increased use of the true alloy steels which today in many cases have been dropped in favor of the less expensive carbon steels.

First use of malleable iron in automotive construction was in hubs, stated Messrs. Touceda and Lansing. Characteristics and adequacy of the material demonstrated in this important element attracted attention of designers, and use was immediately made of malleable in many other chassis and body parts. Rear axle assemblies, differential carriers, cases, bearing caps and brake supports are now cast in this shock-resistant metal.

In the important steering gear assemblies, malleable iron serves as a safeguard in housings, supports and brackets. It plays a similar role in spring hangers, spring clips and seats, steering post brackets, bumper brackets, brake and clutch pedals and brackets, wheel carriers and various body parts. It affords strength, resistance to impact and economy in shock absorbers, radiator inlets and outlets, exhaust pipe flanges, generator and fan assembly supports. This shock and corrosion resistant and easily machinable material well serves the two purposes of dependability and economy, the authors asserted.

Modifications of normal malleable iron, known as pearlitic malleables, have for the past few years been produced for use when wearing properties accompanied by a reasonable amount of toughness are

in demand. The product has a matrix which consists of silico-ferrite and pearlite or sorbite and may contain some spheroidized cementite. Much depends upon the character of the matrix as to the mechanical properties. Briefly the ultimate strengths vary from between about 60,000 to 90,000 pounds per square inch, the elongation in the former averaging around 12 per cent and in the latter not more than 3 per cent.

In general, pearlitic malleable has higher average yield point and ultimate strength and lower elongation than normal malleable iron. It machines less readily and has a higher indentation hardness. Applications include use where rigidity and wear resistance are important factors, such as in gears, sprockets, air tools and wearing pads.

Some malleable iron producers, it was pointed out, also are engaged in the manufacture of the conventional type of malleable iron to which usually is added a small amount of copper and molybdenum. These alloy castings have found numerous applications, since they have a yield point that approximates 45,000 pounds per square inch and an ultimate strength in the vicinity of 62,000 pounds per square inch, accompanied by an elongation in some instances as high as 20 per cent.

Protective Link

■ The ability to carry peak over-loads, and at the same time to disconnect transformers automatically from power lines in case of internal trouble, is made available by a new protective link between bushing terminal and winding, developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Despite their small size, three of them can interrupt 500,000 kilovolt-amperes, 3phase, at the first zero point of current. Several sizes of these links make the scheme applicable to transformers of from 2400 to 66,000 volts. Very definite thermal characteristics permit this link to be co-ordinated with other current-disconnecting devices on the system, in addition to permitting transformer to carry useful peak overloads.

Fast-Baking Enamel

■ To enable manufacturers to speed up production by reducing time needed for finishing, Maas & Waldstein, Newark, N. J., offer "Polydur" synthetic enamels in white and all colors for spraying or dipping with very short baking schedules. Enamels set out of dust in a few minutes. Baking schedules depend upon temperature; at 325 degrees Fahr., enamels bake to a fine finish without discoloration in 15 minutes.

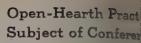
Subways Offer Market For Enameling Sheets

■ More extensive use of porcelain enamel and enameling sheets in vehicular tunnels is indicated by the Porcelain Enamel institute, Chicago, as result of a recent inspection of the lining of the Detroit-Canada tunnel by Robert W. Hunt Co., inspection engineers, Chicago.

The institute points out that 6000 tons of enameling sheets would be required if porcelain enameling were specified for three large projects now underway—the Chicago subway, the Sixth avenue subway in

New York, and the Pennsylvania all-weather highway between Pittsburgh and Harrisburg. Lining material for these projects have not yet been selected.

Hunt Co. engineers reported "the present condition of the porcelain enamel steel tile in the Detroit-Canada tunnel, together with information on conditions of installation, exposure, replacement and service, lead to the conclusion that porcelain enamel steel tile can be furnished which, properly installed by competent craftsmen, will form a lining eminently suitable for all the requirements of subaqueous vehicular tunnels."



■ Sixth in a series of open on open-hearth problems in the bureau of mines au Pittsburgh, June 2, under ship of the National Open committee, American Ins Mining and Metallurgical E Questions covering refered pouring practice, open slag control, acid melting and general practice were

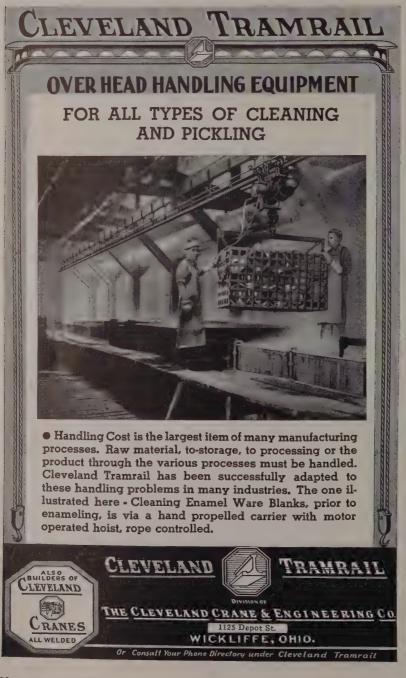
Highlight of the meetin paper by Dr. John Chipma sor of physical metallurg chusetts Institute of Te Cambridge, Mass., on the power of slag. The speake sized that the research and his colleagues are put the effects of slag in the hearth is far from comple factors still need to be in thoroughly before the actuing power of slag can mined.

Considerable interest pouring practice was display values of etch tests con the most time. No stand tice seems to be followed gard to the etch test and able difference of opinion to the exact value of this

Several methods of m pipe in ingots were discus particular emphasis on the in connection with small from 10 to 15 tons. Mol use of compounds, portal and other methods were of

Resistance Welding

- A new type welding tip by P. R. Mallory & Co. Inc apolis, now is available f ance welding of all kinds plete range of standard size signs. It is the result of research work conducted in ation with resistance wel chine manufacturers and us sistance welding. It emb forms, water hole depths, v nesses and other features long life of the tips and their efficiency. Tips are n new process which yields strength, hardness and elec thermal conductivity. has a round bottom, with n to trap steam. This com announces complete standa of its water-cooled holders
- Factory sales of mechar ers in April, reported to the census, numbered 35 pared with 3837 in March April, 1938, and 6082 in April, 1938, and 1938, and



Ad Trucks

n point of manufac-

ince the use of pallets handling operations t. Now the bolts are llets in the screw mahent and transferred om where the pallets or seven high. From are delivered to the eded, being handled hese operations as a shows one of the douets loaded with rim pled on the trailer with on the fork truck double-faced pallets ing the units. Here re comparatively few savings due to the imd are substantial.

icient use of pallets using of boxed copper of as edgewise-wound. Previously, boxes of overe handled by crane, Now they are placed pallet which permits four at a time, using See Fig. 3.

edgewise wound cops similarly improved. ormerly handled, one a crane, they are now at a time on the palin addition to the subg in time by the new thossibility of damaging reatly reduced, due to mber of handlings re-

et arial handling devices et ed during their spare r purposes than material, it has been found. In application is the eavy punches and dies. The fork type batter in readily be used for heavy punches and reeing the crane for

ning Strip

ded from Page 57)

electrotinplate applied on the steel base.

semibright electrotin-

semibright scratched electrotinplate.

semibright electrotinluced directly from the This product appears many commercial apich as for dry-pack cans ies; also, if a coating of suitable lacquer is applied, it may be used for certain wet-pack products.

Fused electrotinplate, type 3 above, applied directly to the steel base commands the most attention because it combines low cost with a high degree of quality in the coated product. Remainder of this article is devoted exclusively to this type of tinplate.

The recommended method for continuous production of fused electrotinplate is as follows: Steel strip is taken in coils from the temper mill and mounted on two payout reels. The strip is fed continuously to the tinning line alternately

from the two payout reels, the trailing end of the preceding strip being attached to the leading end of the succeeding strip by multiple spot welding—sufficient strip storage being provided in a slack producer to allow time for the welding operation.

In the tinning line, the strip is first subjected to a thorough cleaning by the oxide electrocleaner, as previously described; followed by an acid pickle, rotating brushes and a water rinse. This produces a chemically clean surface.

The cleansed strip then is passed directly into the electrotinning apparatus where it receives a fine-



grained deposit of pure metallic tin, evenly distributed over the strip surface.

After suitable rinsing and drying the electrotinned strip enters an oil bath heated to a temperature slightly below the melting point of tin. It then is subjected to a second hot oil bath with a temperature above the melting point of tin, wherein the coating is fused; afterwards it is passed directly into a cold oil bath to solidify the tin before crystal growth can occur.

Next the oil is removed from the fused electrotinplate by a solvent cleaner. Cleaned tinplate then runs through a flattening and cutting machine, where it is cut to the desired length, and is delivered to the classifier.

Tinplate produced by this method can be varied from less than ¼-pound of tin per base box to 2 or 3 pounds or more, depending on specific requirements. It is quite bright, relatively free from porosity and can be soldered easily. The figures in Table I are an average of several identical hydrogen evolution tests on this fused electrotinplate, without undercoating.

The tin coating of the fused electrolytic product is uniform. There

are no "drip edges". The surface is practically 10 pure. This is important as the corrosion of ting pendent on the electron set up by the impurities and the acid or alkaling of the food product.

This electrotinning a high speed of operation possible large tonnage from a single tinning it is believed, low product Present design of electrosis for strip speeds upper minute with tonnage 96 tons of finished ting hour turn.

Added to these mederating, and quality ad the large factor of tin is almost no tin loss is electrolytic method. savings in tin cost an ductions in tin inventoriachieved, while the quatinplate is improved.

Weld Galvanized

(Concluded from Perconfined spaces, masks air from an outside so be worn by the operat factory type is a simple a large hose leading of tance necessary to assair supply. This type quire an air pump.

In the Southwestern country, welded galva systems have been in supears and no indication erated corrosion has be grain elevator in this tory has a great many chutes which have been by bronze welding. Gramp and some clings of the chute. Even the situation is highly condrosion, these chutes excellent operating come

A company, that for has been manufacturiacetylene generating unlighting, employs broth for joining galvanized. Thousands of these uthroughout the country ing conditions, are subly to water of varying tensity and to soil coternally. Welding app pair them in no way.

Another company that welding in manufactu quantities of galvanized cials for county and st departments also reporticeability of welded joints. This type of passes all the tests county and federal a require.



mand Steady Or Slightly Heavier

Steelmaking Rises But Subsequent Gains Seen Smaller

in finished steel demand generally are r. Releases against flat-rolled steel orders gradually, and moderate gains have apaquirements of some miscellaneous users. The point rise for the week, and compared to the past three weeks, but substitute the past three weeks, but

s will be retarded for a number of weeks sumption in the automotive industry, dets by mills to accelerate shipments of lowand strip backlogs. Until the model period has been bridged other steel const provide the principal support to pro-

mion of the Briggs strike not only helped to thobile assemblies up sharply last week but the resumption of tool and die work for new lowever, possibility is seen of additional this among tool and die workers through union in other motor companies.

assemblies of 65,265 units last week more and those of the preceding holiday period and per cent larger than a year ago. General reased from 23,670 to 30,640, Chrysler from 15, Ford from 1600 to 17,660 and all others to 8820.

vity Continues Steel Products

steel products continue rather prominent developments. Shipments of structural documents reinforcing bars show further new business continues fairly heavy despite off in awards last week from the peak level ak before. Texas Corp. has placed a 7000-line. Lehigh & New England railroad has freight cars, and the Milwaukee road has too tons of steel for 1000 box cars it will be Pennsylvania will build 25 locomotive tend-

MARKET IN TABLOID*

Demand

Well sustained; flat-rolled releases increasing.

Prices

Some concessions still prevail; scrap up sharply.

Production

Up 1½ points to 53½ per cent.

ers. Rail orders include 2000 tons for the Reading-Central of New Jersey. New inquiries for track material and equipment are small but nearly 3000 freight cars are pending for three roads.

Tin plate specifications continue active, with production holding at 70 per cent. Peak of the season in demand and operations is believed near, but heavy shipments are in prospect for a number of weeks.

Foundry Operations Trail Rise In Steel Production

Foundry operations are lagging behind the steelmaking trend, and pig iron shipments so far this month are no better than steady compared with May. In some districts seasonal curtailment of foundry schedules is reflected in a decrease in the iron movement. Pig iron sellers are quoting unchanged prices on what little third quarter business is appearing.

Finished steel prices still are subject to concessions in certain instances. In addition to almost habitual weakness in reinforcing bars, plate quotations are being shaded, and official levels on sheets are not yet firmly established. Because of previous coverage new business in flat-rolled products is scant, but shipments are the heaviest since March.

Leading scrap markets are more active, demand being stimulated by recent gains in steelmaking. Higher prices accompany improved buying, and increases at Chicago, Pittsburgh and Philadelphia have moved the scrap composite up 62 cents to \$14.62. This is the highest in nine weeks.

Ingot production was heavier in most centers last week. Pittsburgh increased 1 point to 43 per cent and Youngstown was up 3 points to 51. Other gains included 3 points to 73 at Wheeling, 7 points to 67 at Birmingham, 5 points to 40 in New England, 8 points to 68 at Cincinnati and 9½ points to 47 at St. Louis. Chicago declined 1 point to 52½. Unchanged districts were eastern Pennsylvania at 37, Cleveland at 53, Buffalo at 44 and Detroit at 57.

The finished steel price composite is unchanged at \$55.70.

COMPOSITE MARKET AVERAGES

J	une 10	June 3	May 27	One Month Ago May, 1939	Three Months Ago March, 1939	One Year Ago June, 1938
Iron and Steel Steelworks Scrap	\$35.72	\$35.59	\$35.63	\$35.80	\$36.40	\$38.41
	55.70	55.70	55.70	56.00	56.50	61.55
	14.62	14.00	14.00	14.05	14.98	10.89

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shape pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON PRICES OF

Representative Market Figures for Current Week; Average for Last Month, Three Months and One

Finished Material	June 10, 1939	May 1939	March 1939	June 1938	Pig Iron	June 10, 1939	May 1939	M.
Steel bars, Pittsburgh	., 2.15c	2.20c	2,25c	2.45c	Bessemer, del. Pittsburgh	\$22.34	\$22.34	85
Steel bars, Chicago		2.20	2.25	2.40	Basic, Valley		20.50	5
Steel bars, Philadelphia		2.52	2.57	2.47	Basic, eastern, del, Philadelphia		22.34	5
Iron bars, Terre Haute, Ind	2.05	2.10	2,15	2.35	No. 2 foundry, Pittsburgh		22.21	- 5
Shapes, Pittsburgh	2.10	2.10	2.10	2.25	No. 2 foundry, Chicago		21.00	- 5
Shapes, Philadelphia		2.21 1/2	2.21 1/2	2.40-1/4	Southern No. 2, Birmingham		17.38	1
Shapes, Chicago		2.10	2.10	2,25	Southern No. 2, del. Cincinnati.		20.89	5
Plates, Pittsburgh	2.10	2.10	2.10	2.25	No. 2X, del. Phila. (differ. av.)	23.215	23.215	2
Plates, Philadelphia		2.15	2.15	2.371	Malleable, Valley	21.00	21.00	6
Plates, Chicago		2.10	2.10	2.25	Malleable, Chicago	21.00	21.00	5
Sheets, hot-rolled, Pittsburgh		2.05	2.15	2.40	Lake Sup., charcoal, del. Chicago	28.34	28.34	5
Sheets, cold-rolled, Pittsburgh.		3.10	3.20	3.45	Gray forge, del. Pittsburgh	21.17	21.17	2
Sheets, No. 24 galv., Pittsburgh		3.50	3.50	3.75	Ferromanganese, del. Pittsburgh	85.33	85.33	8
Sheets, hot-rolled, Gary		2.03	2.15	2,40	a			
Sheets, cold-rolled, Gary		3.08	3.20	3.20	Scrap			
Sheets, No. 24 galv., Gary		3.50	3.50	3.80	Heavy melting steel, Pittsburgh	. \$15.25	\$14,55	. 5
Bright bess., basic wire, Pitts		2.60	2.60	2.90	Heavy melt. steel, No. 2, E. Pa	. 13.25	12.75	
Tin plate, per base box, Pitts			\$5.00	\$5.35	Heavy melting steel, Chicago	. 13.75	12.75	
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75	Rails for rolling, Chicago		17.25	
C	1				Railroad steel specialties, Chicag	o 15.50	14.75	
Semifinished Materi	al				C-1			
Sheet bars, Pittsburgh, Chicago	\$34.00	\$34.00	\$34.00	\$37.00	Coke			
Slabs, Pittsburgh, Chicago		34.00	34.00	37.00	Connellsville, furnace, ovens	. \$3.75	\$3.75	
Rerolling billets, Pittsburgh		34.00	34.00	37.00	Connellsville, foundry, ovens		5.00	
Wire rods, No. 5 to 9-inch, Pit		43.00	43.00	47.00	Chicago, by-product fdry, del		10.50	
0.2								

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

designated, prices are hase, f.o.h. cars.

Sheet Steel		O N
	2.00c	Y
Pittsburgh	2.00c	P
Cleveland	2.00c	B
Cleveland Detroit, del	2.00c	P
Buffalo	2.00c	G
Sparrows Point, Md	2.00c	I
New York, del,	2.24c	P
New York, del Philadelphia, del	2.17c	P
Granite City, Ill	2.10c	-
Middletown, O	2.00c	
Youngstown, O	2.00c	Р
Birmingham	2.00c	C
Pacific Coast points	2,50c	G
Cold Rolled		Y
Pittsburgh	3.05c	C
Chicago, Gary	3.05c	N
Bunaio	3.05c	P
Cleveland	3.05c	
Detroit, delivered	3.15c	
Philadelphia, del	3.37c	
New York, del	3.39c	
Granite City, Ill	3.15c	
Middletown, O	3.05c	
Youngstown, O Pacific Coast points	3.05c	
	3.65c	В
Galvanized No. 24		P
Pittsburgh	3.50c	S
Chicago, Gary	3.50c	H
Buffalo	3.50c	C
Philadelphia, del	3.50c 3.67c	
New York, delivered	3.74c	
Birmingham	3.50e	В
	0.000	-

Except when otherwise of	iesigna
Granite City, Ill	3.60c
Middletown, O	3.50c
Youngstown, O	3.50c
Pacific Coast points	4.00c
Black Plate, No. 29 and I	lighter
Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill	3.15c
Long Ternes No. 24 Unas	sorted
Pittsburgh, Gary	3.80c
Pacific Coast	4.50c
Enameling Sheets	
No. 10	No. 20
Pittsburgh 2.75c	3.35c
Chicago, Gary. 2.75c	3.35c
Granite City, Ill. 2.85c	3.45c
Youngstown, O. 2.75c	3.35c
Cleveland 2.75c	3.35c
Middletown, O. 2.75c	3.35c
Pacific Coast 3.35c	3.95c
Corrosion and He	eαt-

	Comper		31000	•	
	osion sistar				ŗt-
	ourgh bo	se, (cents	-	lb.
Bars .			302		

Bars		. 24.	00	25.00
Plates		. 27.	00	29.00
Sheets		. 34.	00	36.00
Hot strip		. 21.	50	23.50
Cold strip		. 28.	00	30.00
Str.	aight	Chro	mes	
	No.	No.	No.	No.
	410	430	442	446
Bars	18.50	19.00	22.50	27.50

Steel Plate

21001 11410	
Pittsburgh	2.10c
New York, del2.19-	-2.29c
Philadelphia, del	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c
Steel Floor Plates	

3.70c 3.95c Pittsburgh 3,35c Standard Shapes

Pittsburgh		 		2.10c
Philadelphia				
New York,				
Boston, del:				
Bethlehem				
Chicago				
Cleveland,	del.	 	 ۰	2.30c

Buffalo					5				
Gulf port									
Birmingh	a	n	n						
St. Louis		(ì	el					
Pacific C	o	a	S	t		I	36	i	Ĭ

Tin and Ter

Tin Plate, Coke Pittsburgh, Gary. (Granite City, Ill. Mfg. Terne Plate Pittsburgh, Gary. (Granite City, Ill.

Bars

3.35c

Soft St Base, 3 to Pittsburgh Chicago or Gary Duluth Birmingham Cleveland ... Buffalo Buffalo
Detroit, delivered
Philadelphia, del.
Boston, delivered
New York, del.
Gulf ports
Pacific Coast poli

(Base, 15 to Pittsburgh Chicago or Gary Detroit, delivered Cleveland

Rail St

-			
2.00c	Strip and Hoops	11 and 12 63 ½ 54	2" O.D. 13 13.04 15.03
2.00c 2.35c		Pitts., Chi., Cleve65-10 off Wrought washers, Pitts.,	2¼"O.D. 13 14.54 16.76 2¼"O.D. 12 16.01 18.45
points 2.60c	(Base, hot-rolled, 1 to 20 tons; cold-rolled, 3 to 25 tons) Hot Strip, 12-inch and less	Chi., Phila., to jobbers	2½" O. D. 12 17.54 20.21
Iron	Pittsburgh, Chicago,	and large nut, bolt	2%" O. D. 12 18.59 21.42 3" O. D. 12 19.50 22.48
e Haute 2.05c	Gary, Cleveland,	mfrs. l.c.l. \$5.40; c.l. \$5.75 off	3" O. D. 12 19.50 22.48 3½" O. D. 11 24.62 28.37
efined 3.50-8.00c	Youngstown, Middle- town, Birmingham 2.00c	Welded Iron,	4" O. D. 10 30.54 35.20
inforcing	Detroit, del 2.10c	Steel Pipe	4½"O.D. 10 37.35 43.04
straight lengths, y distributors	Philadelphia, del 2.32c	-	5" O. D. 9 46.87 54.01 6" O. D. 7 71.96 82.93
ry, Buffalo	New York, del 2.36c	Base discounts on steel pipe. Pitts., Lorain, O., to consumers	
m., Young., 't., Pitts1.90-2.05c	Cooperage hoop, Youngs., Pitts.; Chicago, Birm. 2.10c	in carloads. Gary, Ind., 2 points	Cast Iron Pipe
ered2.00-2.15c	Cold strip, 0.25 carbon	less on lap weld, 1 point less	Class B Pipe-Per Net Ton
	and under, Pittsburgh,	on butt weld. Chicago delivery 2½ and 1½ less, respectively.	6-in., & over, Birm. \$42.00-43.00
ports 2.50c del2.07-2.22c	Cleveland, Youngstown 2.80c Chicago 2.90c	Wrought pipe, Pittsburgh base.	4-in., Birmingham. 45.00-46.00 4-in., Chicago 53.80-54.80
straight lengths,	Detroit, del 2.90c	Butt Weld	6-in. & over, Chicago 50.80-51.80
y distributors	Worcester, Mass 3.00c	Steel	6-in. & over, east fdy. 46.00 Do., 4-in 49.00
fary, Chi- talo, Cleve-	Carbon Cleve., Pitts. 0.26—0.50 2.80c	In. Blk. Galv.	Do., 4-in 49.00 Class A Pipe \$3 over Class B
11.75-1.90c	0.51—0.75	½	Stnd. fitgs., Birm., base \$100.00
ered 1.85-2.00c	0.76—1.00 6.15c	1—3 68 1/3 60 1/3	Semifinished Steel
2.10-2.25c	Over 1.00 8.35c	Iron	
	Worcester, Mass \$4 higher. Commodity Cold-Rolled Strip	³ 4 30 13 1—1 ¹ 4 34 19	Rerolling Billets, Slabs
oducts	PittsCleveYoungstown 2.95c	1—1¼ 34 19 1½ 38 21¼	(Gross Tons) Pittsburgh, Chicago, Gary,
	Detroit, del 3.05c	2 37 1/2 21	Cleve., Buffalo, Young.,
Chicago-Birm. base keg in carloads	Worcester, Mass 3.35c	Lap Weld	Birm., Sparrows Point \$34.00
re nails \$2.45	Lamp stock up 10 cents.	Steel	Duluth (billets) 36.00 Detroit, delivered 36.00
ed nails \$2.45 er pound)	Rails, Fastenings	2 61 52½ 2½3 64 55½	Forging Quality Billets
oles 3.15c	(Gross Tons)	3½6 66 57½	Pitts., Chi., Gary, Cleve.,
staples 3.40c wire, stand-	Standard rails, mill \$40.00	7 and 8 65 55 1/2	Young., Buffalo, Birm. 40.00
gage two-	Relay rails, Pittsburgh 20—100 lbs 32.50-35.50	9 and 10 64½ 55	Duluth 42.00
80-rod spool	Light rails, billet qual.,	Iron 2 30½ 15	Sheet Bars Pitts., Cleveland, Young.,
-point cattle,	Pitts., Chicago, B'ham. \$40.00	2½—3½ 31½ 17½	Sparrows Point, Buf-
nce wire 2.95c	Do., rerolling quality. 39.00	4 33 ½ 21	falo, Canton, Chicago 34.00 Detroit, delivered 36.00
wire 3.35c	Cents per pound Angle bars, billet, mills. 2.70c	4½—8 32½ 20 9—12 28½ 15	Wire Rods
fencing (base mn) 67.00	Do., axle steel 2.35c Spikes, R. R. base 3.00c	Line Pipe	Pitts., Cleveland, Chicago,
bale ties,	Track bolts, base 4.15c	Steel	Birmingham No. 5 to $\frac{9}{33}$ inch incl
facturing Trade	Car axles forged, Pitts.,	1 to 3, butt weld 67%	Do., over \$\frac{3}{20}\$ to \$\frac{47}{47}\$-in. incl. 48.00
- Cleve Chicago-	Chicago, Birmingham. 3.15c Tie plates, base 2.15c	2, lap weld 60 2½ to 3, lap weld 63	Do., over $\frac{9}{32}$ to $\frac{47}{64}$ -in. incl. 48.00 Worcester up \$2; Galveston
wire)	Base, light rails 25 to 60 lbs.,	3½ to 6, lap weld 65	up \$6; Pacific Coast up \$9.
basic wire 2.60c	20 lbs., up \$2; 16 lbs. up \$4; 12	7 and 8, lap weld 64	Skelp Pitts., Chi., Young., Buff.,
wire 2.65c	lbs. up \$8; 8 lbs. up \$10. Base railroad spikes 200 kegs or	10-inch lap weld 63 ½ 12-inch, lap weld 62 ½	Coatesville, Sparrows Pt. 1.90e
Mass., \$2 higher on	more; base plates 20 tons.	Iron	Coke
sic and spring wire.	Bolts and Nuts	Blk. Galv.	Price Per Net Ton
Vils		% butt weld 25 7 1 and 1% butt weld 29 13	Beehive Ovens
¥ 11S	Pittsburgh, Cleveland, Bir- mingham, Chicago. Discounts	1½ butt weld 33 15½	Connellsville, fur \$3.75
s (ittsburgh\$3.60	to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.	2 butt weld 32½ 15 1½ lap weld 23½ 7	Connells ville, fdry. 4.75-5.50 Connell. prem. fdry. 5.75-6.25
0-2-1 1 D	full containers additional 10%.	1½ lap weld 23½ 7 2 lap weld 25½ 9	New River fdry 6.50- 6.75
nished Bars	Carriage and Machine	2½ to 3½ lap weld 26½ 11½	Wise county fdry 5.50- 5.75
Carbon Alloy	½ x 6 and smaller68.5 off	4 lap weld 28 ½ 15 4 ½ to 8 lap weld 27 ½ 14	Wise county fur 4.50- 4.75 By-Product Foundry
2.65e 3.35e 2.65e 3.35e	Do. larger, to 1-in66 off Do. 1% and larger64 off	9 to 12 lap weld 23 1/2 9	Newark, N. J., del 10.88-11.35
2.65c 3.35c	Tire bolts52.5 off	7) 11 M 1	Chi., ov., outside del 9.75
2.70c *3.45c	Stove Bolts	Boiler Tubes	Chicago, del 10.50 Terre Haute, del 10.00
2.65e 3.35e 2.65e 3.35e	In packages with nuts attached 72.5 off; in packages with	Carloads minimum wall seam-	Milwaukee, ovens 10.50
đ,	nuts separate 72.5-12½ off;	less steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pitts- burgh, base price per 100 feet	New England, del 12.50 St. Louis, del 11.00-11.50
(77 .)	bulk 84 off on 15,000 of 3-inch	burgh, base price per 100 feet subject to usual extras.	Birmingham, ovens. 7.00
ars (Hot)	and shorter, or 5000 over 3-in. Step bolts60 off	Lap Welded	Indianapolis, del 10.00
Ruffelo (Thi	Elevator bolts60 off	Char-	Cincinnati, del 9.75 Cleveland, del 10.30
Buffalo, Chi- assillon, Can-	Plow bolts68.5 off	coal	Buffalo, del 10.50
lehem 2.70c	Nuts	Sizes Gage Steel Iron 1½"O.D. 13 \$ 9.72 \$23.71	Detroit, del 10.25
ivered 2.80c	Semifinished hex. U.S.S. S.A.E. 6-inch and less. 67 70	1%"O.D. 13 11.06 22.93	Philadelphia, del 10.65
off. S.A.E. Diff.	⁹ -1-inch 64 65	2" O. D. 13 12.38 19.35	Coke By-Products
).35 31000.70	1% and larger 62 62	2¼"O.D. 13 13.79 21.68 2¼"O.D. 12 15.16	Snot, gal., freight allowed east
1.75 3200 1.35 1.55 3300 3.80	Hexagon Cap Screws	2½ "O. D. 12 16.58 26.57	Spot, gal., freight allowed east of Omaha
2.25 34003.20	Upset, 1-in., smaller67.5 off	2¾"O.D. 12 17.54 29.00 3" O.D. 12 18.35 31.36	Pure and 90% benzol 16.00c
0.25 Mo 0.55	Square Head Set Screws Upset, 1-in., smaller75.0 off	3½"O.D. 11 23.15 39.81	Toluol, two degree 22.00c Solvent naphtha 26.00c
0 0.30 Mo. 1.50-	Headless set screws70.0 off	4" O.D. 10 28.66 49.90	Industrial xylol 26.00c
1.10 Cr 0.45	Piling	5" O. D. 9 44.25 73.93 6" O. D. 7 68.14	Per lb. f.o.b. Frankford and
ring flats 0.15	Pitts., Chgo., Buffalo 2.40c	Seamless	St. Louis Phenol (200 lb. drums) 16.25c
; flats 0.85	Gulf ports 2.75c	Hot Cold	Do. (450 lbs.) 15.25c
······ 1.50	Rivets, Washers	Sizes Gage Rolled Drawn 1" O. D. 13 \$ 7.82 \$ 9.01	Eastern Plants, per lb. Naphthalene flakes, balls,
n 0.85 flats 0.15	Structural, Pittsburgh,	1" O. D. 13 \$ 7.82 \$ 9.01 1\(''\) O. D. 13 9.26 10.67	bbls. to jobbers 5.75c
rounds, squares 0.40	Cleveland, Chicago 3.40c	1½"O.D. 13 10.23 11.79	Per ton, bulk, f.o.b. port Sulphate of ammonia\$28.00
furnace up 50 cents.	75-inch and smaller,	1 % " O. D. 13 11.64 13.42	

Pig Iron

No. 2 Malie-

7.50c

8.00c 8.25c

\$2.00 2.10

\$1.10 1.15

1.25

1.40

tract, any quantity, freight allowed, lb....
Do, spot carlots, bulk Do, ton lots
Do., less-ton lots.....

Tungsten Metal Powder,

drum lots, lb......
Do, smaller lots.....
Vanadium Pentoxide,

contract, lb. contained
Do, spot
Chromium Metal, 98%

cr., 0.50 carbon max., contract, lb. con.

| 10, | 10, | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. | 2011. |

according to grade, spot shipment, 200-lb.

Molybdenum P 99%, f.o.b. Yorl 200-lb. kegs, lb. Do, 100-200 lb. Do, under 100-lb

Molybdenum
Briquets, 48-52%
lybdenum, per
contained, f.o.b.

ducers' plant ...

able

Fdry.

Delivered prices include swit No. 2 foundry is 1.75-2.25 sil.; 20 2.25 sil.; 50c diff. below 1.75 sil	oc dill. for	eacn	nly as 0.25 sil.	noted. above	St. Louis, northern St. Louis from Birminghar St. Paul from Duluth	$n \dots + 21.12 \dots 2$
B180 B111 000 W111 0000 11 110 B1	No. 2 A	/Ialle-		Besse-	†Over 0.70 phos.	The The
Basing Points:		able	Basic	mer		ow Phos.
Bethlehem, Pa		22.50	\$21.50	\$23.00	Basing Points: Birdsboro and \$26.50, base: \$27.76	d Steetton, Pa., and Star 4 delivered Philadelphia
Birdsboro, Pa	22.00	22.50	21.50	23.00		
Birmingham, Ala	17.38		16.38	22.00	Gray Forge	Charcoa
Buffalo	21.00	21.50 21.00	20.00 20.50	22.00 21.50	Valley furnace\$20	50 do del Chicago
Chicago	21.00	21.00	20.50	21.50	Pitts, dist. fur 20	.50 do., del Chicago Lyles, Tenn.
Detroit	21.00	21.00	20.50	21.50		Silvery
Duluth	21.50	21.50		22.00	Jackson county, O., base: 6-	
Erie, Pa	21.00	21.50	20.50	22.00	7-7.50—\$26.50; 7.51-8—\$27.	.00: 8-8.50\$27.50: 9.5
Everett, Mass	22.00	22.50	21.50	23.00	9-9.50—\$28.50; Buffalo, \$1	.25 higher.
Granite City, Ill.	21.00	21.00	20.50	21.50		r Ferrosilicon†
Hamilton, O	21.00	21.00 21.00	20.50 20.50	21.50		
Provo Iltah	. 19.00	21.00	20.50	21.00	Jackson county, O., base; Pi	rices are the same as i
Provo, Utah	21.00	21.00	20.50	21.50	plus \$1 a ton. †The lower all-rail delivered	price from Jackson O
Sparrow's Point, Md.	22.00		21.50		is quoted with freight allo	
Swedeland, Pa	22.00	22.50	21.50	23.00	Manganese differentials in sil	
Toledo, O	21.00	21.00	20.50	21.50	\$1 per ton add. Each unit	
Youngstown, O	21.00	21.00	20.50	21.50		
+Cubicat to 90 cents deduction	. for 0.70	non oo	ant phoc	nhorus	Refractories	Imported dead by
‡Subject to 38 cents deduction or higher.	1 101 0.70	ber, ce	ent phos	huor.na	Per 1000 f.o.b. Works, Net Pri	Imported dead - bucces grains, net ton
of flighter.					Fire Clay Brick	Chester. Pa., and
					Super Quality	Chester, Pa., and timore bases (ba
Delivered from Basing Points:					Pa., Mo., Ky \$60	.80 Do. domestic
Akron, O., from Cleveland	22.39	22.39	21.89	22.89	First Quality	Do., f.o.b. Chev
Baltimore from Birmingham.			21.66			.50 Wash., net ton, b
Boston from Birmingham	22.12			00.50		net ton, bags
Boston from Everett, Mass	22.50	23.00	22.00 22.00	23.50 23.50	New Jersey 52 Second Quality	wuichact magne
Boston from Buffalo Brooklyn, N. Y., from Bethleho		25.00	22.00	23.00	Pa., Ill., Ky., Md., Mo 42	grains, f.o.b. Cl
Canton, O., from Cleveland		22.39	21.89	22.89	Georgia, Alabama 34	lah, Wash., net, Basic Bri
Chicago from Birminghom			-2.00		New Jersey 49	0.00 Net ton. f.o.b. Bal
Cincinnati from Hamilton, O	21,24	22.11	21.61		Ohio 20	Net ton, f.o.b. Bal mouth Meeting, C 190 Chrome brick
Cincinnati from Birmingham.	21.06		20.06		First quality 39	.90 Chrome brick
Cleveland from Birmingham.			20.82			DE CALCAIA, DOLLAGOR CALLOR
Mansfield, O., from Toledo, O.		22.94	22.44	22.44		TITOPICOTOC DIAGON
Milwaukee from Chicago		22.10	21.60	22.60	Malleable Bung Brick	Chem, bonded mag
Muskegon, Mich., from Chica Toledo or Detroit	gu, 94 19	24.19	23.69	24.69	All bases\$56	Fluorspar, 85
Newark, N. J., from Birmingha	am 23 15	24.15	20.05	44.05	Silica Brick	
Newark, N. J., from Bethlehem	23.53	24.03			Pennsylvania \$47 Joliet, E. Chicago 55	
Philadelphia from Birmingham	22.46	1	21.96		Birmingham, Ala 47	7.50 Washed gravel, f.o.
Philadelphia from Swedeland, I	Pa. 22.84	23.34	22.34		Ladle Brick	Ky., net ton, car
Pittsburgh district from Nev	ille (Neville	e base	, plus 69	e, 84c,	(Pa., O., W. Va., Mo.)	
Island	\and \$:	1.24 fr	eight.		(Pa., O., W. Va., Mo.) Dry press	3.00 Do. barge
Saginaw, Mich., from Detroit.	23.45	23.45	22.95	22.95	Wire cut \$26	.00 No. 2 lump
			Fer	roallo	y Prices	
Ferromanganese, 78-82%,	hon ner	r lh o	ontained	1	corlots contr. net ten \$140	50 contract contate
tidewater, duty pd \$80.00			······		carlots, contr., net ton.\$142. Do, spot 145.	contract, carlots %-in., lb.
Do., del. Pittsburgh 85.33	Do., ton	lots		17.25c	Do, contract, ton lots 145.	.00 Do, 2%
Spiegeleisen, 19-21% dom.	Do., les	s-ton	lots	. 17.75c	Do, spot, ton lots 150.	
Palmerton, Pa., spot. 28.00			r- Ton	Less	15-18% ti., 3-5% carbon,	Silicon Briquets, co
Do., 26-28%, Palmer-			ds lots	ton	carlots, contr., net ton 157.	
ton 33.00	2% carb	. 16.5	0c 17.25c	2 17.50c	Do, spot 160.	.00 lowed, ton
Ferrosilicon, 50% freight	1% carb	. 17.5	0c 18.25	c 18.50c	Do, contract, ton lets. 160.	.00 Carload, spot
allowed, c.l 69.50	1% carb 0.10% car	b. 18.5	0c 19.25c	e 19.50c	Do, spot, ton lots 165.	.00 Less-ton lots, lb
Do., ton lot 80.50	0.20% car	b. 19.5	0c 20.25c	20.50c	Alsifer, contract carlots,	Manganese Briq
Do., 75 per cent 126.00	_		higher		f.o.b. Niagara Falls, lb. 7.5	
Spot, \$5 a ton higher.	Ferromoly	bdenu	m, 55		Do, ton lots 8.0 Do, less-ton lots 8.5	Daren Provident
Silicoman, 2½ carbon. 88.00			nt., f.o.b		Do, less-ton lots 8.5	
2% carbon, 93.00; 1%, 103.00					Spot %c lb. higher	Ton lots Less-ton lots
Contract ton price \$11 higher; spot \$5 over	Calcium :				Chromium Briquets, con-	Spot 4c h
contract.			lo.b. mill		tract, any quantity,	25c Zirconium Ailoy, 12
Ferrotungsten, stand 1h	Ferrotitan	ium,	40-45%	,	freight allowed, lb 7.2 Do, spot carlots, bulk 7.5	

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots...
Do., less-ton lots...
20-25% carbon, 0.10

20-25% carbon, 0.10 max., ton lots, lb....

Do, less-ton lots..... Spot 5c higher

Ferrocolumbium, 50-60%,

contract, lb. con. col., f.o.b. Niagara Falls...

Do, less-ton lots Spot is 10c higher

echnical molybdenum trioxide, 53 to 60% mo-lybdenum, 1b. molyb.

cont., f.o.b. mill.... Ferro-carbon-titanium, 15-

18%, ti., 6-8% carb.,

Technical

Ferrotungsten, stand., 1b.

40%, 10, cont. 2.00-2.1 Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, \$3 unitage, 58.50; electro-lytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% \$3 unitage

Ferrochrome, 66-70 chromium, 4-6 carbon, cts.

67-72% carloads, 2% car-

10.50c 10.50c 10.50c 10.50c 10.50c 10.50c 11.25c 10.50c 11.50c 11.50c 11.50c

con. del. cars1.60-1.65 Ferrovanadium, 35 to 40%, lb., cont...2.70-2.80-2.90

75.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

1	Soft Bars	Bands	Hoops	Plates ¼ -in. & Over	Struc- tural Shapes	Floor Plates	Hot Rolled	Sheets— Cold Rolled	Galv. No. 24
tropolitan)	3.88 3.84	4.06 3.96	5.06 3.96	3.85 3.76	3.85 3.75	5.66 5.56	3.71 3.40	4.78 4.60	4.61 4.50
	3.60	3.60	4.10	3.40	3.40	5.00	3.40		4.43
	3.70 3.90	3.80 4.00	4.80	3.55	3.55	5.00	3.55	4.90	4.30
2.			••••	3.75	3.75	5,20	3.75	*** *	5.40
,	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.40
	3.35	3.60	3.60	3.40	3.40 •	5.00	3.35	4.45	4.50
	3.25 3.33	3.50 3.43	3.50 3.68	3,40 3,60	3.58	5.18	3.35	4.55	4.62
E	3.60	3.67	3.67	3.65	3.65 3.68	5.27 5.28	3.43 3.42	4.50	4.59 4.57
			3.75						
Paul	3.50 3.75	3.75 3.85	3.85	3.55 3.80	3.55 3.80	5.15 5.40	3.35	4.30	4.25
s. raur	3.73	3.88	3.88	3.68	3.68	5.28	3.60 3.63	4.95 4.58	4.50 4.63
	3.62	3.72	3.72	3.47	3.47	5.07	3.38	3.32	4.53
	4.05	4.15	4.15	4.00	4.00	5.60	3,90		5.00
	3.90	4.00	4.00	3.95	3.95	5.71	3.75		5.00
	3.80	3.90	3.90	3.85	3.85	5.80	3.65		4.40
	4.54	4.64	4.64	4.41	4.41	6.01	4.32		5.29
Ala	3.50	3.60	3.60	3.55	3.55	5.88	3.35		4.75
1	3.85	4.65	4.65	3.80	3.80	5.75	4.10		4.60
:	3.50	5.85	6.25	4.05	4.05	5.65	3.95		5.25
		3.85	5.20	3.40	3.50	5.25	3.70		4.75
g	4.00 4.00	4.40 4,50	6.10 6.35	4.00	4.00	5.50	3.95	6.50	4.75
	3.50	3,90	6.00	4.00 3.45	4.00 3.45	6.20 5.05	4.20 3.45	6.30 6.40	4.75 5.15
		0.00	0,00				0.40		
					llad Dana (F				
	Cold	Cold	1005			Unannealed) -	21.00	SA	
	Rolled Strip	Finished Bars	1035- 1050	2300 Series	3100 Series	Unannealed) - 4100 Series	6100. Series		wn Bars 3100
	Rolled Strip 3.46	Finished Bars 4.13	1050 4.18	2300 Series 7.50	3100 Series 6.05	4100 Series 5.80		Cold Dra 2300 8.63	3100 7.23
	Rolled Strip 3.46 3.51	Finished Bars 4.13 4.09	1050 4.18 4.04	2300 Series 7.50 7.35	3100 Series 6.05 5.90	4100 Series 5.80 5.65	Series 7.90	Cold Dra 2300 8.63 8.59	7.23 7.19
	Rolled Strip 3.46 3.51 3.66	Finished Bars 4.13 4.09 4.06	1050 4.18 4.04 3.85	2300 Series 7.50 7.35 7.31	3100 Series 6.05 5.90 5.86	4100 Series 5.80 5.65 5.61	Series 7.90 8.56	Cold Dra 2300 8.63 8.59	3100 7.23
	Rolled Strip 3.46 3.51 3.66	Finished Bars 4.13 4.09 4.06 4.05	1050 4.18 4.04 3.85 3.85	2300 Series 7.50 7.35 7.31	3100 Series 6.05 5.90 5.86	4100 Series 5.80 5.65 5.61	Series 7.90 8.56	Cold Dra 2300 8.63 8.59	7.23 7.19
	Rolled Strip 3.46 3.51 3.66	Finished Bars 4.13 4.09 4.06 4.05 4.15	1050 4.18 4.04 3.85 3.85	2300 Series 7.50 7.35 7.31	3100 Series 6.05 5.90 5.86	4100 Series 5.80 5.65 5.61	7.90 8.56	Cold Dra 2300 8.63 8.59	7.23 7.19
	Rolled Strip 3.46 3.51 3.66	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75	1050 4.18 4.04 3.85 3.85 	2300 Series 7.50 7.35 7.31 7.10	3100 Series 6.05 5.90 5.86 	4100 Series 5.80 5.65 5.61 5.40	7.90 8.56 8.50	Cold Dra 2300 8.63 8.59 8.15	7.23 7.19 6.75
	Rolled Strip 3.46 3.51 3.66 3.42 3.35	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65	1050 4.18 4.04 3.85 3.85 3.75 3.80	2300 Series 7.50 7.35 7.31 7.10 7.35	3100 Series 6.05 5.90 5.86 5.65 5.95	4100 Series 5.80 5.65 5.61 5.40 5.70	Series 7.90 8.56 8.50 7.75	Cold Dra 2300 8.63 8.59 8.15 8.35	7.23 7.19 6.75 6.95
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75	1050 4.18 4.04 3.85 3.85 	2300 Series 7.50 7.35 7.31 7.10	3100 Series 6.05 5.90 5.86 	4100 Series 5.80 5.65 5.61 5.40	7.90 8.56 8.50	Cold Dra 2300 8.63 8.59 8.15	7.23 7.19 6.75
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85	Series 7.90 8.56 8.50 7.75 7.70	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15	7.23 7.19 6.75 6.95 6.75
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97	4100 Series 5,80 5,65 5,61 5,40 5,70 5,85 5,72	Series 7.90 8.56 8.50 7.75 7.70 7.19	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15 8.45	7.23 7.19 6.75 6.95 6.75 7.05
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99	4100 Series 5,80 5,65 5,61 5,40 5,70 5,85 5,72 5,74	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15 8.45 8.50	100 7.23 7.19 6.75 6.95 6.75 7.05 7.10
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.80 3.39 3.93	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15 8.45 8.50 8.25 8.84 8.48	6.75 6.75 6.75 7.10 6.75 7.05 7.10 6.85 7.44 7.08
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93 4.02	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.90 3.93 3.92	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02	8.15 8.35 8.15 8.35 8.15 8.35 8.15 8.45 8.45 8.50	6.75 6.75 6.75 7.10 6.75 7.05 7.10 6.85 7.44 7.08 7.22
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 3.76	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.80 3.39 3.93	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15 8.45 8.50 8.25 8.84 8.48	6.75 6.75 6.75 7.10 6.75 7.05 7.10 6.85 7.44 7.08
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 3.76	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93 4.02 4.30 4.31	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.80 3.90 3.93 3.93	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97	8.56 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15 8.45 8.50 8.25 8.84 8.48 8.62	84 Bars 3100 7.23 7.19 6.75 6.95 6.75 7.05 7.10 6.85 7.44 7.08 7.22
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 3.76	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.98 4.02 4.30 4.31 4.39	1050 4.18 4.04 3.85 3.85 3.85 3.80 3.30 3.38 3.65 3.90 3.93 3.92	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 6.00 6.08 6.22	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15 8.45 8.50 8.25 8.84 8.48 8.62	6.75 6.75 6.75 7.10 6.75 7.10 6.85 7.44 7.08 7.22
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 3.76	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93 4.02 4.30 4.31 4.39 4.79	1050 4.18 4.04 3.85 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.80 3.90 3.92	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97	8.56 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02	Cold Dra 2300 8.63 8.59 8.15 8.35 8.15 8.45 8.50 8.25 8.84 8.48 8.62	84 Bars 3100 7.23 7.19 6.75 6.95 6.75 7.05 7.10 6.85 7.44 7.08 7.22
	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 3.76	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.98 4.02 4.30 4.31 4.39	1050 4.18 4.04 3.85 3.85 3.85 3.80 3.30 3.38 3.65 3.90 3.93 3.92	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02	8.15 8.35 8.15 8.35 8.15 8.45 8.45 8.25 8.84 8.46 8.48	6.75 6.75 6.75 7.10 6.75 7.05 7.10 6.85 7.44 7.08 7.22
Ala	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 3.76 5.00	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93 4.02 4.30 4.31 4.39 4.79 4.43 5.10	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.80 3.90 3.93 3.92	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97	8.56 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02	8.15 8.35 8.15 8.35 8.15 8.45 8.25 8.84 8.48 8.62	6.75 6.75 6.70 7.20 7.19 6.75 6.75 7.05 7.10 6.85 7.44 7.08 7.22
Ala	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 5.76 5.00	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93 4.02 4.30 4.31 4.39 4.79 4.43	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.80 3.90 3.93 3.92	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97 7.65 7.85	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02 8.45 B.70	8.15 8.15 8.15 8.45 8.15 8.45 8.10 8.25 8.25 8.26 8.26 8.27 8.38 8.48 8.48 8.62	6.75 6.95 6.75 7.10 6.75 6.75 7.05 7.10 6.85 7.44 7.08 7.22
Ala	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 5.00 5.00	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93 4.02 4.30 4.31 4.39 4.79 4.43 5.10 5.60	1050 4.18 4.04 3.85 3.85 3.80 3.30 3.38 3.65 3.80 3.90 3.92 5.65	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62 9.00 9.40	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22 7.80 8.00 8.55	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97 7.65 7.85 8.40	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02 8.45 B.70 B.05	8.15 8.35 8.15 8.45 8.45 8.45 8.62 10.40	6.75 6.75 6.75 7.10 6.85 7.14 7.08 7.22
Ala.	Rolled Strip 3.46 3.51 3.66 3.42 3.35 3.20 3.40 3.45 3.65 3.76 4.45 *9.30	Finished Bars 4.13 4.09 4.06 4.05 4.15 3.75 3.65 3.75 3.80 4.00 3.75 4.34 3.93 4.02 4.30 4.31 4.39 4.79 4.43 5.10 5.60 5.60	1050 4.18 4.04 3.85 3.85 3.75 3.80 3.30 3.38 3.65 3.80 3.90 3.93 3.93 3.92 5.65 6.10	2300 Series 7.50 7.35 7.31 7.10 7.35 7.30 7.42 7.44 7.25 7.45 7.48 7.62 9.00	3100 Series 6.05 5.90 5.86 5.65 5.95 5.85 5.97 5.99 5.85 6.00 6.08 6.22 7.80 8.00	4100 Series 5.80 5.65 5.61 5.40 5.70 5.85 5.72 5.74 5.60 8.59 5.83 5.97 7.65 7.85	Series 7.90 8.56 8.50 7.75 7.70 7.19 8.84 7.65 9.19 7.88 8.02 8.45 B.70	8.15 8.15 8.15 8.45 8.15 8.45 8.10 8.25 8.25 8.26 8.26 8.27 8.38 8.48 8.48 8.62	6.75 6.95 6.75 7.10 6.75 6.75 7.05 7.10 6.85 7.44 7.08 7.22

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, June 8

Structural shapes . . . Plates, †1/4-in. or 5

Sheets, galv., corr., 24 ga. or 0.5 mm....

Plain wire....

Bands and strips...

Fdy. pig iron, Si. . 2.5 \$23.17

rices f. o. b. Port of Dispatch-

Domestic Prices at Works or Furnace-Last Reported

£sd

 Fdy. pig iron, Si. . 2.5
 \$23.17
 4 19 0(a) \$16.61
 626.

 Basic bess. pig iron.
 21.65
 4 12 6(a) ...
 ...

 Furnace coke.
 5.38
 1 4 2 5.96
 225

 Billets.
 34.52
 7 7 6 25.04
 945

 Standard rails.
 1.99e 9 10 0 1.56c
 1,50c
 1,50c

 Merchant bars.
 2.42c 11 12 0†† 1.44c
 1,202

 Structural shapes.
 2.17c 10 8 0†† 1.41c
 1,173

3.08c 14 15 0§

3.61c 17 5 0

4.08c 19 10 0

4 19 0(a) \$16.61

2.29c 10 19 3†† 1.82c 1,515

2.58c 12 7 0†† 1.61c 1,340

French

Francs

626.75 \$17.05

6.89

29.32

2.06c

1,65c

1.65c

2.06c

2.36c

4.13c

2.48c

1.95c 1,300

Channe or a ports,
Quoted in old pounds terling £ s d
2 3 0 2 2 0
4 10 0 5 0 0
5 15 0 2 6 to 5 4 0 2 6 to 4 17 6 2 6 to 6 2 6
7 15 0° 9 5 0 2 6 to 5 5 0 2 6 to 7 5 0

			4.936	1 13 0
a., corr.			3.52c	
8	2.77c	13 5 0	1.95c to 2.00c	5 26 to 5 50
	4.08c	19 10 0	2.33c to 2.76c	6 26 to 7 50
base		23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
1111211			2.66c to 2.85c	7 00 to 7 10 0
108 lbs.	\$ 4.74	1 0 3		
anganese	\$80.00 d	elivered 2	Atlantic seaboar	d duty-paid.

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. \$1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

2.17c 1,805‡

3.30c 2,750

1.74c 1,450

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

Reich

Mark

96.50

63

27.88 (ъ) 69.50

7.62 19

2.38c 132

1.98c 110

2.59c 144‡

3.11c 173

2.29c 127

1.93c

2.29c

6.66c 370

38.71

Belgian

Francs

202

860

1.375

1.100

1.100

1,575‡

2,750

500 \$25.27

IRON AND STEEL SCRAP PRICES

Corrected to Friday night.			
		rs,except where otherwise stated:	tindicates brokers;
HEAVY MELTING STEEL Birmingham, No. 1. †12.00	Cleveland 7.00- 7.50 Detroit 4.25- 4.75	Pittsburgh 16.00-16.50 St. Louis 13.00-13.50	Eastern Pa. St. Louis, 14-34"
Bos. dock No. 1 exp. 13.75-14.00	Eastern Pa 8.50	Seattle 16.00	CAR WHEELS
New Eng del. No. 1 14.00	Los Angeles 4.50- 5.00	FROGS, SWITCHES	Birmingham
Buffalo, No. 1, R. R. 13.50-14.00	New York †3.50- 4.00 Pittsburgh 8.00- 8.50	Chicago 13.50-14.00	Boston dist., iron.
Buffalo, No. 1 13.00-13.50	St. Louis 3.50- 4.00	St. Louis, cut 13.00-13.50	Buffalo, steel
Buffalo, No. 2 11.00-11:50 Chicago, No. 1 13.50-14.00	Toronto, dealers 4.25- 4.75		Chicago, iron
Chicago auto no	Valleys 9.00- 9.50	ARCH BARS, TRANSOMS	Chicago, rolled ster
alloy 12.25-12.75	SHOVELING TURNINGS	St. Louis 13.50-14.00	Cincin., iron, deal. Eastern Pa., iron
Chicago, No. 2 auto 10.50-11.00	Buffalo 7.25- 7.75	PIPE AND FLUES	Eastern Pa., steel
Cincinnati, dealers 10.50-11.00 Cleveland, No. 1 13.75-14.25	Cleveland 7.50- 8.00	Chicago, net 8.50- 9.00	Pittsburgh, iron.
Cleveland, No. 2 12.50-13.00	Chicago	Cincinnati, dealers 6.00- 6.50	Pittsburgh, steel
Detroit. No. 1 9.00- 9.50	Detroit 5.25- 5.75		St. Louis, iron
Detroit, No. 2 8.50- 9.00	Pitts., alloy-free 9.50-10.00	RAILROAD GRATE BARS	St. Louis, iron .
Eastern Pa., No. 1 15.50 Eastern Pa., No. 2 13.00-13.50	BORINGS AND TURNINGS	Buffalo	NO. 1 CAST SCRA
Federal, Ill 11.25-11.75	For Blast Furnace Use	Cincinnati, dealers. 5.75-6.25	Birmingham Boston, No. 1 mach
Granite City, R. R. 11.25-11.75	Boston district 2.00	Eastern Pa 12.50-13.00	N. Eng. del. No. 2
Granite City, No. 2. 10.50-11.00 Los Angeles, No. 1. 13.00-14.00	Buffalo 6.75- 7.25	New York	N. Eng. del. textile
Los Angeles, No. 2. 12.00-13.00	Cincinnati, dealers 2.75- 3.25	5t. 25415 5.00 5.50	Buffalo, cupola .
N. Y. dock No. 1 exp. 12.00-12.50	Cleveland 7.50- 8.00 Eastern Pa 6.50- 7.00	RAILROAD WROUGHT	Buffalo, mach Chicago, agri. nei
Pitts., No. 1 (R. R.), 16,00-16,50	Detroit 4.75- 5.25	Birmingham†11.00-11.50	Chicago, auto net
Pittsburgh, No. 1. 15.00-15.50 Pittsburgh, No. 2. 14.00-14.50	New York +250-200	Boston district †9.50-10.00 Eastern Pa., No. 1. 16.00-16.50	Chicago, railroad ne
St. Louis, R. R 11.75-12.25	Pittsburgh 7.50- 8.00 Toronto, dealers 3.50- 4.00	St. Louis, No. 1 9.75-10.25	Chicago, mach. net Cincin., mach. den
St. Louis, No. 2 10.50-11.00		St. Louis, No. 2 11.50-12.00	Cleveland, mach.
San Francisco, No. 1 13.00-13.50	AXLE TURNINGS	FORGE FLASHINGS	Detroit, cupola, n
Seattle, No. 1 11.00-12.00 Toronto, dlrs. No. 1 . 9.25- 9.75	Boston district †7.50 Buffalo 9.50-10.00	Boston district ' †7.50	Eastern Pa., cupole
Valleys, No. 1 14.50-15.00	Chicago, elec. fur 14.00-14.50	Buffalo 11.00-11.50	E. Pa., mixed yar Los Angeles, net
COMPRESSED SHEETS	East. Pa., elec. fur 13.00-13.50	Cleveland 11.00-11.50	Pittsburgh, cupola
Buffalo 11.00-11.50	St. Louis 9.00- 9.50 Toronto 4.00- 4.25	Detroit 8.50- 9.00 Los Angeles 9.00	San Francisco, del
Chicago, factory 12.75-13.25 Chicago, dealers 11.75-12.25		Pittsburgh 13.50-14.00	Seattle
Cincinnati dealers. 10.00-10.50	CAST IRON BORINGS Birmingham †6.00- 6.50		St. Louis, cupola St. Louis, agri. mae
Cleveland 13.75-14.25	Boston dist. chem †4.50	FORGE SCRAP	St. L., No. 1 mach.
Detroit	Buffalo 6.75- 7.25	Boston district †6.50 Chicago, heavy 15.50-16.00	Toronto, No. 1,
E. Pa., new mat 15.50 E. Pa., old mat 11.50-12.00	Chicago 6.50- 7.00 Cincinnati, dealers 2.75- 3.25	LOW PHOSPHORUS	mach., net
Los Angeles 14.00-14.50	Cleveland 7.50- 8.00	Cleveland, crops 17.50-18.00	HEAVY CAST
Pittsburgh 15.00-15.50	Detroit 4.75- 5.25	Eastern Pa., crops. 17.00-17.50	Boston dist, break
St. Louis 9.50-10.00 Valleys 14.00-14.50	E. Pa., chemical 10.00-11.00	Pitts., billet, bloom,	New England, del. Buffalo, break.
	New York / †3.50- 4.00 St. Louis 2.50- 3.00	slab crops 19.00-19.50	Cleveland, break, n
BUNDLED SHEETS			Cieveranu, break, i
	Toronto, dealers 3.75- 4.25	LOW PHOS. PUNCHINGS	Detroit, auto net.
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50	Toronto, dealers 3.75- 4.25 RAILROAD SPECIALTIES	Buffalo 15.50-16.00	Detroit, auto net. Detroit, break
Buffalo, No. 1	Toronto, dealers 3.75- 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75	Buffalo	Detroit, auto net. Detroit, break Eastern Pa
Buffalo, No. 1	Toronto, dealers 3.75- 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto net New York, break
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50	Toronto, dealers 3.75- 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto net New York, break
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50	Toronto, dealers 3.75- 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto, net New York, break Pittsburgh, break.
Buffalo, No. 1	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25 - 15.75 ANGLE BARS—STEFL Chicago 15.25 - 15.75 St. Louis 13.00 - 13.50 SPRINGS Buffalo 15.50 - 16.00	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto ne New York, break Pittsburgh, break STOVE PLATE Birmingham
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00-14.50 St. Louis 7.00-7.50 Toronto, dealers 8.00-8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00-8.50	Toronto, dealers 3.75 - 4.25 RAILROAD SPECIALTIES Chicago	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto, ne New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00-14.50 St. Louis 7.00-7.50 Toronto, dealers 8.00-8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00-8.50 Detroit 7.00-7.50	Toronto, dealers. 3.75- 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 St. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto ne New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00-7.50 Toronto, dealers 8.00-8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00-8.50 Cincinnati, dealers 6.00-6.50 Detroit 7.00-7.50 tLos Angeles 3.75-4.00	Toronto, dealers. 3.75- 4.25 RAILROAD SPECIALTIES Chicago	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto, ne New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Cincinnati, dealers 6.00- 6.50 Detroit 7.00- 7.50 tLos Angeles 3.75- 4.00 St. Louis 6.00- 6.50	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa. 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto, ne New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Cincinnati, dealers 6.00- 6.50 Detroit 7.00- 7.50 tLos Angeles 3.75- 4.00 St. Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75	Toronto, dealers. 3.75- 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL Chicago 15.25-15.75 ST. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto nel New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Cincinnati, dealers 6.00- 6.50 Detroit 7.00- 7.50 tLos Angeles 3.75- 4.00 St. Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25 - 15.75 ANGLE BARS STEFL Chicago 15.25 - 15.75 St. Louis 13.00 - 13.50 SPRINGS Buffalo 15.50 - 16.00 Chicago, coil 16.50 - 17.00 Chicago, leaf 15.00 - 15.50 Eastern Pa. 17.00 - 17.50 Pittsburgh 18.00 - 18.50 St. Louis 14.00 - 14.50 STEEL RAILS, SHORT Birmingham 12.00 - 12.50	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston 15.00-15.50 Chicago 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto ne' New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo. Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00-7.50 Toronto, dealers 8.00-8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00-8.50 Clincinnati, dealers 6.00-6.50 Detroit 7.00-7.50 ILos Angeles 3.75-4.00 St. Louis 6.00-6.50 Toronto, dealers 4.25-4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL Chicago 15.25-15.75 ST. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (3 ft.) 16.00-16.50	Buffalo	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto ne' New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo. Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis
Buffalo, No. 1	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 St. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (3 ft.) 16.00-16.50 Chicago (2 ft.) 16.50-17.00	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston 15.00-15.50 Chicago 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto net New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00-7.50 Toronto, dealers 8.00-8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00-8.50 Cincinnati, dealers 6.00-6.50 Detroit 7.00-7.50 Los Angeles 3.75-4.00 St. Louis 6.00-6.50 Toronto, dealers 4.25-4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincinnati, No. 1, deal. 7.00-7.50 Cincinnati, No. 1, deal. 7.00-7.50 Cincinnati, No. 2 1.75-2.25	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.50-17.00 Cincinnati, dealers 16.25-16.75	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto, ne' New York, break Pittsburgh, break Pittsburgh, break Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R.
Buffalo, No. 1	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 St. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (3 ft.) 16.00-16.50 Chicago (2 ft.) 16.50-17.00	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston 15.00-15.50 Chicago 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto net New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham. R. R. New England, del.
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Cincinnati, dealers 6.00- 6.50 Detroit 7.00- 7.50 tLouis 3.75- 4.00 St. Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincinn, No. 1, deal 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa. 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-15.50 Pitts., 3 ft. and less 18.50-19.00	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Roston 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district 14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto ne' New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, net MALLEABLE Birmingham, R. R. New England, del. Buffalo
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Cincinnati, dealers 6.00- 6.50 Detroit 7.00- 7.50 tLouis 3.75- 4.00 St. Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincin, No. 1, deal 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00 Toronto, dealers 3.75- 4.25	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa. 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 15.00-15.50 Pitts., 3 ft. and less 18.50-19.00 St. Louis, 2 ft. & less 16.25-16.75	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto nel New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. R. Cincin., agri., deal.
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Cincinnati, dealers 6.00- 6.50 Detroit 7.00- 7.50 tLos 6.00- 6.50 Detroit 8.75- 4.00 St. Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincinn, No. 1, deal. 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00 Toronto, dealers 3.75- 4.25 MACHINE TURNINGS (Long)	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL Chicago 15.25-15.75 St. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicanti, dealers 16.25-16.75 Detroit 16.00-16.50 Los Angeles 15.00-15.50 Pitts, 3 ft. and less 18.50-19.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAF	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Roston 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district 14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto, nel New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. R. Cincin., agri., deal. Cieveland, rall
Buffalo, No. 1	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa. 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 15.00-15.50 Pitts., 3 ft. and less 18.50-19.00 St. Louis, 2 ft. & less 16.25-16.75	Buffalo 15.50-16.00 Chicago 15.50-16.00 Pittsburgh 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAHLS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Roston 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto, nel New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. R. Cincin., agri., deal. Cleveland, rall Eastern Pa., R. R.
Buffalo, No. 1	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL Chicago 15.25-15.75 ST. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (3 ft.) 16.00-16.50 Chicago (2 ft.) 16.50-17.00 St. Louis 14.00-16.50 Los Angeles 15.00-15.50 Pitts., 3 ft. and less 18.50-19.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAP Boston district †13.50-14.00 Buffalo 15.50-16.00 Chicago 13.50-14.00	Buffalo	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto, nel New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, net MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. R. Cincin., agri., deal. Cleveland, rall Eastern Pa., R. R. Los Angeles Pittsburgh, rall
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Cincinnati, dealers 6.00- 6.50 Detroit 7.00- 7.50 tLouis 3.75- 4.00 St. Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincin, No. 1, deal 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00 Toronto, dealers 3.75- 4.25 MACHINE TURNINGS (Long) Birmingham 4.50- 5.00 Buffalo 6.00- 6.50 Buffalo 6.00- 6.50	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL Chicago 15.25-15.75 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa. 17.00-17.50 Pittsburgh 18.00-18.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAP Roston district †13.50-14.00 Buffalo 15.50-16.00	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Roston 15.00-15.50 Chicago 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00 St. Louis, No. 1 12.25-12.75 SHAFTING	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto nel New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. R. Cincin, agri, deal. Cleveland, rall Eastern Pa., R. R. Los Angeles
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincinn, No. 1, deal. 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00 Toronto, dealers 3.75- 4.25 MACHINE TURNINGS (Long) Birmingham †4.50- 5.00 Buffalo 6.00- 6.50 Chicago 7.00- 7.50 Chicanati, dealers 4.00- 4.50	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 STEEL RAILS, SHORT Birmingham 112.00-12.50 STEEL RAILS, SHORT Detroit 16.00-16.50 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-14.00 Chicago (2 ft.) 15.50-16.00 Chicago (2 ft.) 15.50-16.00 Chicago (2 ft.) 16.00-16.50	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAHLS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Roston 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00 St. Louis, No. 1 12.25-12.75 SHAFTING Boston district †15.50-16.00 New York †15.50-16.00	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto net. New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, m MALLEABLE Birmingham. R. R. New England, del. Buffalo Chicago, R. R. Cincin., agri., deal. Cleveland, rall Eastern Pa., R. R. Los Angeles Pittsburgh, rail St. Louis, R. R.
Buffalo, No. 1	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 SPRINGS Buffalo 15.00-15.50 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 St. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.00-16.50 Chicago (2 ft.) 16.00-16.50 Pitts., 3 ft. and less 18.50-19.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAP Boston district †13.50-14.00 Buffalo 15.50-16.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 15.00-16.50 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 15.00-16.50 Chicago 15.00-16.50	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAHLS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston 17.50-18.00 New York †14.00-14.50 Eastern Pa., 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa., 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00 St. Louis, No. 1 12.25-12.75 SHAFTING Boston district †15.50-16.00 New York †15.50-16.00 New York †15.50-16.00	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto ne' New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, not MALLEABLE Birmingham. R. R. New England, del. Buffalo Chicago, R. Cincin., agri., deal. Cleveland, rall Eastern Pa., R. R. Los Angeles Pittsburgh, rail St. Louis, R. R. molybdenum co
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincinn, No. 1, deal. 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00 Toronto, dealers 3.75- 4.25 MACHINE TURNINGS (Long) Birmingham †4.50- 5.00 Buffalo 6.00- 6.50 Chicago 7.00- 7.50 Cincinnati, dealers 4.00- 4.50 Iron Ore	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 STELL RAILS, SHORT Birmingham 112.00-12.50 STEEL RAILS, SHORT Birmingham 112.00-12.50 Chicago (2 ft.) 16.50-17.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAP Roston district 113.50-14.00 Buffalo 15.50-16.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Eastern Local Ore Cents, unit, del. E. Pa. Foundry and basic	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAILS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston \$15.00-15.50 Chicago 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00 St. Louis, No. 1 12.25-12.75 SHAFTING Boston district †15.25-15.50 New York †15.50-16.00 No. Afr. low phos. 12.00 Swedish low phos. 12.00	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto, net New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. R. Cincin., agri. deal Cleveland, rail Eastern Pa., R. R. Los Angeles Pittsburgh, rail
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincinn, No. 1, deal. 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00 Toronto, dealers 3.75- 4.25 MACHINE TURNINGS (Long) Birmingham †4.50- 5.00 Buffalo 6.00- 6.50 Chicago 7.00- 7.50 Chicanati, dealers 4.00- 4.50	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 STEL RAILS, SHORT Buffalo 15.00-15.50 Eastern Pa. 17.00-17.50 Pittsburgh 18.00-18.50 STEEL RAILS, SHORT Buffalo 16.50-17.00 Chicago (2 ft.) 15.00-15.50 Pitts., 3 ft. and less 18.50-19.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAP Roston district 13.50-14.00 Buffalo 15.50-16.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Chicago 19.00-9.25	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAHLS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Roston 17.50-18.00 New York †14.00-14.50 Eastern Pa., 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa., 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00 St. Louis, No. 1 12.25-12.75 SHAFTING Boston district †15.25-15.50 New York †15.50-16.00 No. Afr. low phos. 12.00 Swedish low phos. 12.00 Spanish No. Africa basic, 50 to 60%	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto, net New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. R. Cincin, agri, deal. Cleveland, rall Eastern Pa., R. R. Los Angeles Pittsburgh, rail St. Louis, R. R. molybdenum col
Buffalo, No. 1 11.00-11.50 Buffalo, No. 2 10.00-10.50 Cleveland 9.50-10.00 Los Angeles 14.00 Pittsburgh 14.00-14.50 St. Louis 7.00- 7.50 Toronto, dealers 8.00- 8.50 SHEET CLIPPINGS, LOOSE Chicago 8.00- 8.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Detroit 7.00- 7.50 Louis 6.00- 6.50 Toronto, dealers 4.25- 4.75 BUSHELING Buffalo, No. 1 11.00-11.50 Chicago, No. 1 12.50-13.00 Cincinn, No. 1, deal. 7.00- 7.50 Cincinnati, No. 2 1.75- 2.25 Cleveland, No. 2 7.50- 8.00 Detroit, No. 1, new 9.50-10.00 Valleys, new, No. 1 13.50-14.00 Toronto, dealers 3.75- 4.25 MACHINE TURNINGS (Long) Birmingham †4.50- 5.00 Buffalo 6.00- 6.50 Chicago 7.00- 7.50 Cincinnati, dealers 4.00- 4.50 Iron Ore	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEFL Chicago 15.25-15.75 STELL RAILS, SHORT Birmingham 112.00-12.50 STEEL RAILS, SHORT Birmingham 112.00-12.50 Chicago (2 ft.) 16.50-17.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAP Roston district 113.50-14.00 Buffalo 15.50-16.00 Chicago 13.50-14.00 Chicago 13.50-14.00 Eastern Local Ore Cents, unit, del. E. Pa. Foundry and basic	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAHLS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Boston 17.50-18.00 New York †14.00-14.50 Eastern Pa. 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa. 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00 St. Louis, No. 1 12.25-12.75 SHAFTING Boston district †15.25-15.50 New York †15.50-16.00 No. Afr. low phos. 12.00 Spanish No. Africa basic, 50 to 60% nom. 10.00-10.50	Detroit, auto net. Detroit, break Eastern Pa. Los Ang., auto, nel New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, n MALLEABLE Birmingham, R. R. New England, del. Buffalo Chicago, R. C. Cincin, agri, deal. Cleveland, rall Eastern Pa., R. R. Los Angeles Pittsburgh, rail St. Louis, R. R. molybdenum co tained, f.o.b, m
Buffalo, No. 1	Toronto, dealers. 3.75 - 4.25 RAILROAD SPECIALTIES Chicago 15.25-15.75 ANGLE BARS—STEEL Chicago 15.25-15.75 ST. Louis 13.00-13.50 SPRINGS Buffalo 15.50-16.00 Chicago, coil 16.50-17.00 Chicago, leaf 15.00-15.50 Eastern Pa 17.00-17.50 Pittsburgh 18.00-18.50 ST. Louis 14.00-14.50 STEEL RAILS, SHORT Birmingham †12.00-12.50 Buffalo 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicago (2 ft.) 16.50-17.00 Chicinati, dealers 16.25-16.75 Detroit 16.00-16.50 Los Angeles 15.00-15.50 Pitts., 3 ft. and less 18.50-19.00 St. Louis, 2 ft. & less 16.25-16.75 STEEL RAILS, SCRAP Boston district †13.50-14.00 Buffalo 15.50-16.00 Chicago 13.50-14.00	Buffalo 15.50-16.00 Chicago 15.50-16.00 Eastern Pa., crops 17.50-18.00 Pittsburgh 17.50-18.00 Seattle 15.00 RAHLS FOR ROLLING 5 feet and over Birmingham †14.00-15.00 Roston 17.50-18.00 New York †14.00-14.50 Eastern Pa., 17.00-17.50 St. Louis 16.00-16.50 STEEL CAR AXLES Birmingham †15.00-16.00 Boston district †14.50 Chicago, net 17.50-18.00 Eastern Pa., 20.50-21.00 St. Louis 17.00-17.50 LOCOMOTIVE TIRES Chicago (cut) 15.50-16.00 St. Louis, No. 1 12.25-12.75 SHAFTING Boston district †15.25-15.50 New York †15.50-16.00 No. Afr. low phos. 12.00 Swedish low phos. 12.00 Spanish No. Africa basic, 50 to 60%	Detroit, auto net Detroit, break Eastern Pa. Los Ang., auto, net New York, break Pittsburgh, break. STOVE PLATE Birmingham Boston district Buffalo Chicago, net Cincinnati, dealers Detroit, net Eastern Pa. New York, fdy. St. Louis Toronto dealers, net Eirmingham. R. R. New England, del. Buffalo Chicago, R. R. Cincin., agri. deal. Cleveland, rail Eastern Pa., R. R. Los Angeles Pittsburgh, rail St. Louis, R. R molybdenum cotalned, f.o.b. mi

12.00

Foreign manganifer-ous ore, 45.55% ous ore, 45.55% iron, 6-10% man. nom.

Caucasian, 50-52

N. F., fdy., 55%... 7.00 Chrome ore, 48% gross ton, c.i.f....\$23.00-24.00 Molybdenum ores sulphide, per lb.

Old range bessemer \$5.25 Mesabi nonbessemer 4.95 High phosphorus 4.85 Mesabi bessemer 5.10 Old range nonbessemer 5.10

ts, Strip

Strip Prices, Pages 84, 85

- Automotive releases ase in miscellaneous detarted a definite upward a sheet and strip operamill schedules are near best rate in more than s, with further gains with the start of new hobile production. Strip also are higher at about the but galvanized sheet s down seasonally to 51. The price situation is

Releases against reled steel orders are insome instances being
n expected. Automotive
an exception, since new
irements will continue
number of weeks. New
ess is slow. Sharp price
still appear occasionally
ed sheets, but some prolise to meet such quota-

New business in flatis light, generally being a before the price-cutting roduction is increasing from recent heavy buywww. About 3000 tons of e reported involved in a er from the Milwaukee r freight car building.

k — Sheet specifications by active despite a moderal letdown in consumption sers. With buyers generavered into third quarter, we little opportunity to current backlogs this varehouses in particular ed on galvanized as well d cold rolled sheet needs er.

ices are still soft in spots, ducers having completely concessions of lasst wever, as consumers genered substantially in May of the original price outrent concessions are bring-tle new tonnage.

Sheet and strip producoderately heavier as proattempting to clear books ce orders taken recently. ous consumers account for lage, with only small lots oped to the automotive in-

phia—Despite heavy covently, much sheet inquiry ared for carlots and more, his has been booked on the 00c, Sparrows Point. Shipuctions on low-priced tombeen received on well over

half so far. It is conceded, however, that large consumers are well covered through fourth quarter. Reported inquiry of the Florida East Coast railroad for two seven-car diesel-electric trains may result in a large inquiry for stainless strip from a local interest.

Cincinnati—Sheet deliveries are better than 50 per cent of rolling capacity. Despite heavy buying recently at price concessions new business has declined less than anticipated. Automotive specifications

are considered in normal proportion to total tonnage.

St. Louis—Specifications continue to expand moderately. More interest is being shown in galvanized sheets, particularly heavier grades. Enameling stock, less active than a month ago, is expected to quicken soon.

Birmingham, Ala.—Sheet bookings, especially roofing, are up slightly over last week. Output is estimated at better than 60 per cent. Some strip also is being turned out.



BRIGHT FINISH UNCOATED . ELECTRO COATED



• Electro coated Thomastrip is cutting costs for many manufacturers. Through our special rolling and plating processes Nickel, Brass, Copper and other electro coatings can be supplied economically and will not crack or peel during forming operations. The exceptional quality of the coatings frequently eliminates further finishing operations.

Thomas processes achieve quality coatings for many requirements and solve the problem of finish by obtaining the desired quality at the least cost. Let us discuss your requirements and see if we have a definite economy to offer you.

THE THOMAS STEEL COMPANY . Warren, Ohio

Plates

Plate Prices, Page 84

New York—Current and prospective plate business is heavier. Oil company work involves 2800 tons for ten tanks to be built at Bayonne, N. J., for Asiatic Petroleum Corp. and heat exchangers and pressure stills for Standard of New Jersey. A large plate tonnage is involved in 40,000 tons of steel for 24 naval vessels placed recently and in 30,000

tons required for 12 merchant ships to be bid July 11. Outstanding in freight car material are requirements for a maximum of 1110 cars for the Western Maryland, bids June 22.

Concessions on plates of \$2 a ton are available, with the delivered market here again holding at 2.19c to 2.29c. Even sharper cuts have been reported recently, but only in scattered instances.

Philadelphia — Prices are fairly steady, with most tonnage being

: RASSERT

placed at 2.10c, Claymont, I cessions are the exception of about 500 tons each by ing and Pennsylvania railiprovide an adequate test of ket. The Pennsylvania placed in the Company of the testing of the

Birmingham, Ala.—Plate have shown some increas the past 10 days. Product approximately 60 per cent.

San Francisco—Slight ment in demand for plates though most inquiries are lots. Thompson Manufactubooked 228 tons for pensithe Elephant Butte power the Rio Grande project Mexico and 100 tons for our for the Fresno dam, Mi project, Mont. Awards to tons, bringing the year's a to 17,249 tons, compared 171 tons for the same perioago.

Seattle — Inquiry is more jobs involving less than 100 dominating. Bids go to reconstruct bureau, Bend, Oreg., June volving placing of conduit li 105 tons 96-inch outlet Wickiup dam. Thompson Denver, has been award pipes for the Fresno dam, In project., Mont., 100 tons or



- The valve should operate in a straight line rather than as a goggle.
- 2 The valve structure should have sufficient beam strength to require no support from the ground.
- 3 The valve must be self-contained in that it must embody an expansion joint, the retracting mechanism being completely independent of the structure of the valve body. Movement of the clamping flange must be positive in both directions.
- The valve opening must be equal to the diameter of the pipe, and must be free from obstruction to the flow of gas.
- The valve plate must be sufficiently stiff to avoid accidental distortion, and to maintain a tight joint. It must be capable of positive mechanical movement in both directions. It should be capable of full counterweighting when operating vertically.

- 6 The valve must be capable of location and operation in any position, vertical, horizontal or inclined. For this reason the valve plate should be positively moved away from engagement with its seat at the beginning of motion, and should be returned to contact at the end of motion.
- 7 The construction must be adapted to the use of either hot or cold gas.
- The operating mechanism of the valve should be on the outside, and capable of examination. The mechanism should be capable of lubrication, and should be dirtproof.
- 9 The contacting surfaces should be of non-corrosive material.
- 10 The valve should be capable of rapid manual operation without undue exertion by the operator.

For further particulars, address us at Chicago or Pittsburgh.

Plate Contracts Place

2790 tons, 10 tanks, Asiatic Corp., Bayonne, N. J., to Iron Works, Warren, Pa.

228 tons, penstock, Elephant Brant, Rio Grande project, specification 1217-D, to Thom Co., Denver.

200 tons, tunnel liners, United gineer office, Los Angeles, pr to Youngstown Steel Car Corp town, O.

100 tons or more, Fresno dam Thompson Mfg. Co., Denver.

Plate Contracts Pend

135 tons, 300,000-gallon elevi McChord Field, Wash.; Chica & Iron Co., Chicago, low.

Unstated tonnage, three oil sto for Big West Oil Co., Spoka house & Price, Spokane, engi

Tin Plate

Tin Plate Prices, Page

Tin plate specifications be nearing their peak for Production, holding at 70 also is thought likely reached its maximum,

H. A. BRASSERT

310 South Michigan Avenue CHICAGO, ILLINOIS

and COMPANY
436 Seventh Avenue
PITTSBURGH, PENNA.

les are expected to be ok for canning operaable despite the amount oods carried over from leavy food crops generced for.

Prices, Page 84

-Diversified sources are in recent moderate imin bar demand. Some tonnage is included but portion is for new mod-0 is set as the deadline tion of quantity deduclers of 75 tons and over. the lower base price of ned on smaller lots.

 Carbon and alloy bar s dropped off somewhat e of light automotive dedecreasing requirements equipment industry. A e of miscellaneous interver, continue to support and no protracted downpieral demand is indicated. erally are fair, with deme items not sufficiently ovide a test.

Demand for alloy bars is light and generally is condary sellers. A slight nt in forging bar busited from small tool and parts interests. Prices ady. Shipyard releases g, with specifications for itending upward.

k-Buying continues limjobber specifications light tonnage coming from Machine tool demand is but still fair. Automoory companies are existon stocks. Brisk specior special alloys continue rnment shops and aircraft Bar sellers state they will the June 30 deadline on to large buyers which tity differentials and a \$1 over the flat price hencee applied to all orders of over.

phia -Miscellaneous bar little more than steady. es are contributing only Cold finished bars are airly well, especially to heavy equipment. Prices vith no test of consequence on quantity lots for third Quantity buyers face a \$1 or that period.

- Bar mill schedules are Automotive orders are at production is supported sion in shape and reinforcspecifications. Substantial or new automobile models

are not expected for several weeks. Birmingham, Ala.—A scattering of concrete reinforcing bars is coming out but expected business from

implement manufacturers has not developed.

Wire

Wire Prices, Page 85

Pittsburgh—Business in merchant products is light and generally unchanged. Prices usually are steady. Many distributors are well covered and are inactive in buying. Manufacturers' wire specifications are light. Automotive buying is expected to continue slow during June. Miscellaneous demand is good, ordering of small lots being fairly frequent.

Cleveland — Business is well sustained, making a favorable comparison with May so far this month. As during the past several months variations in production also are slight. Automotive needs still are depressed but shortly will be stimu-



In every industry, including your own, there are some super-operations that involve unusually severe loads and The machinery used must be "super" too including the bearings that carry the load. American Super-Heavy-Duty Roller Bearings are right for such installations. They're not only Super Heavy-Duty Bearings they're super bearings in every other way, too. American Roller Bearing Company, Pittsburgh, Pa. Pacific Coast Office: 321 West Pico St., Los Angeles.

AMERICAN Heavy-Duty ROLLER BEARINGS

Behind the Scenes with STEEL

Rue de la Penton

■ We really do have quite a nice place here in Cleveland but apparently some one down in Philadelphia has built us up a little too high. Came a letter last week to Steel, Penton Boulevard, Cleveland.

Birds, Work and Worms

■ For pointing a good old-fashioned moral we liked this recent editorial by Arthur W. Wolf of *Motortrade*.

Ever watch a Robin, in the Spring, get a Square Meal? Does he group off with the other Robins and start talking Hard Times? Does he sit down on his tail-feathers and wait for Manna to fall from Heaven? Does he loaf under a bush and say: "There ain't no worms?" Does he worry about conditions in Europe, or what the other Robins are doing? If he doeshe is different from most Robins. Those we know, HUSTLE LIKE HELL. They flop down into a yard, put their ears to the ground and listen to Worm Conversations. When Mr. Worm remarks that he will go up for air. Mr. Robin meets him at the front door, grabs Mr. Worm by the collar and starts pulling. Intent on a meal, Mr. Robin usually wins, even though he gets wet with honest Robin sweat. He stays on the job until he is all wormed up. No stopping to gloat over a single victory. He is either so Dumb he has not heard of Social Security, or so Intelligent that he knows Well Planned Hard Work gets the worms,—or bacon. Have you ever seen a Robin that Starved? I haven't.

More On Birds

■ And speaking of Robins, the other day we learned about one of our readers who is a firm believer in the early bird maxim. In fact, he believes this so ardently that he makes it a point

to have a box in his local postoffice so he can drop in Sunday
after Church and pick up his copy
of STEEL for the coming week.
Says he: "I don't believe I
could spend my Sunday afternoons more profitably, because
on Monday morning I am fully
informed on what is going on in
the industry, before the day's
work begins."

Paging Jesse Owens

As reported in STEEL last week, the triple mill supply convention held this year aboard the Monarch of Bermuda was quite the nertz and marked a new high in convention locale. Momentarily taken in by the idea of a "Running Breakfast" the morning they docked at Bermuda it is unofficially reported that STEEL's eastern manager E. W. Kreutzberg and managing editor A. J. Hain showed up in track shoes and shorts, but otherwise it is understood their conduct was above reproach.

Get Yours Now

■ Senator Tyding's address before the American Iron and Steel institute was plenty good to put it mildly. Complete 8-page reprints are still available. Single copies 10c, 100-500, 5c each, over 500, 4c.

Don't Miss It

■ This week, beginning on page 23. you will find a study and analysis of the steel industry made by Steel's Pittsburgh editor after a thorough-going check-up of the present thinking of leading technicians and executives. It is "must" reading and we suggest you hike right back to the front of the book now and spend the next fifteen minutets learning some things that may influence the future of your business no little amount.

Shrdlu

lated by new model preparations. Chicago — Demand for wire products is fairly closs rate a month ago. Some in June business is looked result of lighter requirements.

result of lighter requirementation automotive and farm equivalent dustries. Merchant processing steadily. Wire metive as a result of a good viroad building.

New York—Demand for well diversified, is limited a small orders for prompt Mills lack backlogs and daitions are closely linked to orders. Rod buying is slow ous consumers covering me about a month back. A prices are steadier than usual

Birmingham, Ala. Althousing, by virtue of relative orders, at approximately of the past few weeks, slackened somewhat from it peak. Most tonnage is great to consumers.

Pipe

Pipe Prices, Page 85

Pittsburgh—Pipe is sligh active. The gain is mostly chant pipe, the result of work. Oil country demand ues slow, with drilling at mum. Steady production oin prospect well into the sur

Cleveland—Pipe business ly heavier than a month ag ard pipe is aided by sustemand for building construmakes relatively the best Oil well casing still is retiquiet in drilling operations, pipe has been moderated Only small lots for gather now are pending, follow award of 7000 tons for a linnois.

Boston—Cast pipe buying leases are well maintained. trict foundry continues of nearly full. Steel pipe defairly active for heating an ing work, but no large proup. Wrought pipe is slow. in demand for corrugated greated pipe for highway noted.

New York — Texas C closed on 7000 tons of 10 for a line in Illinois, the top ported going to an Ohio Several hundred tons of pipe has been placed by Rice, contractor, for the H lege building and severa schools here, and similar for the Mineola, Long Islandouse also has been order Birmingham, Ala—Pipe

well although there large single bookings.

sco—Cast iron pipe the third largest for year, 2117 tons, bring o date to 13,471 tons, in 13,996 tons for the period in 1938. Nation-ripe Co. took 390 tons pipe for South Pasand United States Pipe 1, 200 tons of 4 to 10-ink, Calif.

Port Angeles, Wash., 50 tons universal cast nann & Williams Inc., Central Foundry Co., Ala. Same agency 0 tons for a local ind. The Bethel districtine, Oreg., 325 tons, definitely postponed. thority opened bids 0 feet black steel pipe.

Placed

10-inch, South Pasadena, ional Cast Iron Pipe Co.,

rsal cast iron for Port h., to Marckmann & Wilattle, for Central Found-

gham, Ala. 10-inch, Burbank, Calif., tes Pipe & Foundry Co.,

sal, for private industrial to Central Foundry Co., Ala.

Placed

ch, Texas Corp., for 130containing at East Odin, Ill., wm Sheet & Tube Co.,

* Pending

20-inch, east bay municilistrict, Oakland, Calif.; Pipe & Foundry Co., low and American Cast Iron on 250 tons.

ding miscellaneous cast: S-3, State street subway, June 29. 8-inch, Inglewood, Calif.;

ind, Oreg.; bids opened.

, Cars

terial Prices, Page 85

the Chicago, Milwau-& Pacific to build 1000 its own shops has 8500 tons of steel, of ns are sheets. This has ted to several mills.

vivania will build 25 loders in its own shops. We England has placed ilk cement cars. Read-Central of New Jersey 2000 tons of rails from teel Co. Rail awards so or total about 500,000

tons, compared with 180,000 tons in the same period last year.

Domestic freight car awards in May involve 2051 units, compared with 3059 in April, bringing the fivementh total to 8208. Comparisons follow:

	1939	1938	1937	1936
Jan	3	25	17,806	2,050
Feb	2,259	109	4,972	6,900
March	800	680	8,155	632
April	3,095	15	9,772	4,427
May	2,051	6,014	4,732	8,900
5 mos	8,208	6,843	45,437	22,909
June		1,178	548	5,200
July		0	1,030	7,229
Aug		182	1,475	225
Sept		1,750	1,216	1,750
Oct		2,537	1,355	2,210
Nov		1,232	275	1,550
Dec		2,581	275	23,450
Make 1		10,000	E1 011	04 KO0
Total		16,303	51,611	64,523

During first four months of 1939

class I railroads added 6817 new freight cars, compared with 5302 in the corresponding period last year, according to the Association of American Railroads. New cars added in April numbered 1713.

Car Orders Placed

Chicago, Milwaukee, St. Paul & Pacific, 1000 box cars, 75 cabooses, to own shops.

Lehigh & New England, fifty 70-ton bulk cement cars, to American Car & Foundry Co., New York.

Locomotives Placed

Pennsylvania, 25 locomotive tenders, to own shops.

Rail Orders Placed

Reading Co. & Central Railroad of New Jersey, 2000 tons, to Bethlehem Steel Co., Bethlehem, Pa.



BECAUSE: Hi-Tensile "F" is a fastrunning rod. It is quiet and smooth and has good penetration. Welders find it equally useful on horizontal, vertical and overhead jobs. It is very handy for work in close quarters. Slag and spatter losses are very low.

A weld made with HI-TENSILE "F" has great strength and high ductility—withstands shock exceptionally well.

HI-TENSILE "F" is an ideal electrode for jobs in Cro-Man-Sil, Cor-Ten, H.T.-50 and many other new alloy steels.

Your local Page distributor will give full information on all Page electrodes.

BUY ACCO QUALITY in Page Welding Electrodes, Lay-Set <u>Pre</u>formed Wire Rope, Reading-Pratt & Cady Valves, Campbell Cutting Machines, American Chains and Ford Chain Blocks.

PAGE STEEL & WIRE DIVISION

MONESSEN, PENNSYLVANIA

See our exhibit, Metals Building, New York World's Fair

AMERICAN CHAIN & CABLE COMPANY, Inc.

AMERICAN CHAIN DIVISION • AMERICAN CABLE DIVISION • ANDREW C. CAMPBELL DIVISION • FORD CHAIN BLOCK DIVISION • HAZARD WIRE ROPE DIVISION • HIGHLAND IRON AND STEEL DIVISION • NAMILEY MANUEFACTURING DIVISION • OWEN SIENT SPRING COMPANY, INC. • FAGE STEEL AND WIRE DIVISION • READING-PRATT & CADY DIVISION • READING-STEEL CASTING DIVISION • WERDING MANUFACTURING DIVISION • IN CAMPAON, LTD. • IN ENGLAND, BRITISH WIRE PRODUCTS, LTD. • THE PARSONS CHAIN COMPANY, LTD. • IN ENGLAND, BRITISH WIRE PRODUCTS, LTD. • THE PARSONS CHAIN COMPANY, LTD. • THE BUSINESS FOR YOUT SAFETY.

Shapes

Structural Shape Prices, Page 84

New York—With construction of the piers being underway, inquiry is expected soon on the superstructures, Raritan river bridge, Sayreville, N. J., and the Passaic river span, Neark-Kearney, N. J. Active bridge requirements are heavier, including 1315 tons for New Jersey, part of which has been bid, and 1045 tons, New York state, closing June 21. Awards are down slightly.

Pittsburgh—No new jobs of large size have been announced recently, although placements are more active with several large jobs awarded. A good many of the new placements are of a private nature, but the total tonnage is predominately public works. New inquiries involving more than 100 tons each also show a number of private jobs getting under way.

Cleveland — Private inquiries remain at disappointing low levels. Public work continues to lead, and

still further improveme pated through the next; terest centers in state and school projects.

Chicago—Inquiry is a tion S-3 of the Chicago volving between 1900 are of structural steel and b and 8000 tons of beam riplates, bid June 29. Fa port a quiet market, bu interests state business i tained recently.

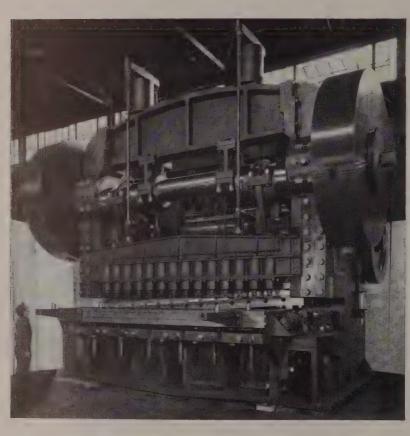
Boston—The Connect ture has approved meas construction of new briding about 1200 tons ear Connecticut river, Hartf Thames, New London, likely to come up for Awards are up slightly, itons for small bridges.

Philadelphia — Hugh Co., Philadelphia, has contract for a warehot Armstrong Cork Co., La requiring 750 tons. heads the list of a doz jobs, private and public ing. Keen competition for work available and erratic.

Buffalo—Activity show improving with the approaching we centered on a few me state bridge contracts. The approaching we centered on a few me state bridge contracts. The are up for bids June 21, 4 tons.

San Francisco—Active pronounced in the strucket with 4737 tons place total to date to 64,657 tore with 47,800 tons in 1938 Steel Co. secured 2000 main cableway tower for dam in California and bearing piles for the UEngineer office, Los Ar

Seattle—Shape awards lead other steel items, of pending work is also Contracts were recer awarding Isaacson Ir Seattle, 7550 tons for



the World's Largest Plate Shear Carries a THOMAS Nameplate

Designed by Thomas engineers and built in the Thomas shops, this Plate Shear was recently delivered to an export customer. Of cast steel construction throughout, the shear has a capacity for cutting plates up to $2\frac{1}{2}$ " thick by $13^{\circ}6$ " wide in ordinary steel.

In addition to many other design refinements on the machine the Timken equipped flywheel shaft carries a newly developed magnetic clutch which permits stopping the ram at any point of the stroke and also allows "inching" the ram down for cutting to a mark.

If you use shears of any type, Thomas engineering facilities are available to you in suggesting designs and features best adapted to your needs. Let us know your requirements.

THOMAS MACHINE MANUFACTURING COMPANY

Name changed from Thomas Spacing Machine Co. PITTSBURGH, PA.

Shape Awards Co

Week ended June 10
Week ended June 3
Week ended May 27
This week, 1938
Weekly average, year
Weekly average, 1939
Weekly average, May
Total to date, 1938
*Revised.

Includes awards of 100 to

ct, Seattle. Washington sing plans and will call the near future for the bridge requiring about

ontracts Placed

vic auditorium, Buffalo, to Steel Co., Bethlehem, Pa.

laduct over Rock Island e Island, Ill., to Bethlehem Bethlehem, Pa.

in cableway tower, Shasta to Columbia Steel Co., San

baring piles, United States ffice, Los Angeles, to Co-1 Co., San Francisco.

Ballard bridge, Seattle, to ron Works, Seattle; previted as 3049 tons.

v driveaway building, Ford Dearborn, Mich., to Whiteles Co., Detroit.

st river drive, Fifty-fourth urth streets, New York, to Bridge Co., Pittsburgh; irier & McLane Corp., New

te bridge, Mazonia, Ill., to Steel Co., Bethlehem, Pa. nmissary building, Horn & J., Philadelphia, to Belmont is, Philadelphia.

actory building, for Great & Coke Co., Niagara Falls, Bethlehem Steel Co., Bethle-

amodore Perry housing projalehem Steel Co., Buffalo.

ate bridge, Akron, O., to n Co., Akron, O.

uilding for General Foods, isco, to Judson-Pacific Co.,

ood River, Oreg., lift span. McGonigle, Portland; Gilpin on Co., Portland, general

ilding, Hanes Hosiery Mills, alem, N. C., to Carolina Steel , Greensboro, N. C.

terations to main building, nstitute, Columbus, O., to Bridge Co., Pittsburgh.

idge FAP-1031-A, Kaufman exas, to Mosher Steel Co.,

usses and lintels, Glenwood roject, Philadelphia, to Roy in, Philadelphia.

illding, for Eddy Paper Co., . Wis., to unknown fabri-

idge FAP-140-O, Williamson exas, to Masher Steel Co.,

nore parkway grade separaklyn, N. Y., contract MS-39prican Bridge Co., Pittsburgh; ohnson, Drake & Piper Co.,

ntral heating plant, Rantoul, nited States government, to tabricator.

s ubway, second section, Chi-American Bridge Co., Pitts-

bard plant, for U. S. Gypsum Brighton, N. Y., to Fort Pitt orks, Pittsburgh.

ate highway bridge, Denver, s City Structural Steel Co., lty, Kans.

rade school and gymnasium,

Barberton, O., to Berger Iron Works, Canton, O.

200 tons, plate girder bridge, Westfield river, Cummington, Mass., to Phoenix Bridge Co., Phoenixville, Pa.; Casper-Ranger Construction Co., Holyoke, Mass., general contractor.

185 tons, E. I. du Pont de Nemours & Co., Wilmington, Del., reinforcing floors in Philadelphia building, to Belmont Iron Works, Philadelphia.

180 tons, alterations and additions to assembly building, Norwood, O., for Chevrolet Motor Co., to Taylor & Gaskin Inc.

180 tons, church building, Newark, N. J., for Our Lady of Good Counsel church, to Bethlehem Steel Co., Bethlehem, Pa.

175 tons, beam-span bridge, Northumberland, N. H., to American Bridge Co., Pittsburgh.

170 tons, building, International Harvester Co., Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

170 tons, store building, for S. S. Kresge Co., Wilmington, Del., to Belmont Iron Works, Eddystone, Pa.

167 tons, three I-beam bridges, two 74foot and one 84-foot, Wilmington, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; Rome Construction Co., Holden, Mass., general contractor.

160 tons, government fish hatchery, Leavenworth, Wash., to American Bridge Co., Pittsburgh.

155 tons, bridge, Pennsylvania railroad, Rockville and Enola yard, Pennsylvania, to American Bridge Co., Pittsburgh.

145 tons, shipyard shop, Electric Boat Co., Groton, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa. 143 tons, underpass, specification 1209-D, Central Valley project, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, state bridge, Mazonia, Ill., to Midland Structural Steel Co., Cicero, Ill.

135 tons, state bridge 1774, Aboite, Ind., to Pan-American Bridge Co., New Castle, Ind.

130 tons, state bridge, Lake Leelanau, Mich., to Wisconsin Bridge & Iron Co., Milwaukee.

128 tons, I-beam bridges, Bridgewater and Goshen, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; Ryan & Densmore, Claremont, Vt., general contractors.

125 tons, bridge, route 11, Wyoming county, Pennsylvania, to American Bridge Co., Pittsburgh.

125 tons, manufacturing plant, for Gelatin Products Co., Detroit, to R. C. Mahon Co., Detroit.

120 tons, machine and storage building, Scott Paper Co., Chester, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

115 tons, bridge over Ottawa river, Lima, O., for Detroit, Toledo & Ironton railroad, to American Bridge Co., Pittsburgh.

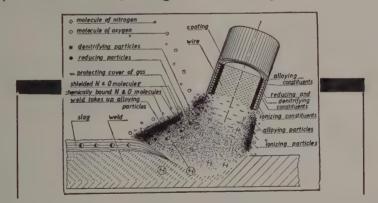
115 tons, bridge, section 110V-F, Agnew, Whiteside county, Illinois, to American Bridge Co., Pittsburgh.

100 tons, Washington state bridge at Brewster, to Isaacson Iron Works Seattle.

Shape Contracts Pending

6000 tons, 11 drum gates, Grand Coulee dam, specification 854, Washington; bids July 12.

All those interested in the alloying process of electrodes, stop and study this sketch



AGILE ELECTRODES bear examination at any time, but the above diagram is particularly interesting because it shows the fusing process of the arc. You can see, for example, how the coating breaks down and adds to the weld metal all the necessary elements in their required amounts. This special

coating gives maximum protection, as it is deposited, against the gases in the atmosphere. AGILE ELECTRODES permit fast, foolproof welding, and are the PERFECT RODS FOR WELDING WITH A. C. TRANSFORMERS. To acquaint you with their properties, samples will be sent free. Write to

AMERICAN AGILE CORP.

Cleveland, Ohio

FREE SAMPLES WILL BE SENT IMMEDIATELY ON REQUEST





The "before and after" picture above shows a carburizing pot hopelessly cracked and ready for scrap—and the same pot restored for useful service. good as new. Pennies spent for Eureka heat resisting electrodes—dollars saved

in a carburizing pot.
The No. 332 rod used for the above is a high nickel chrome alloy. It is a non-magnetic "austenitic" type of heat resisting steel that leaves a tough, ductile deposit. No annealing—No heat treating required.

Let Eureka Save YOU Money

Like the above, other Eureka Specialpurpose rods have been designed for unusual applications. For example, our No. 5545 Copper Nickel Alloy rod produces machinable welds on cast iron. Eureka No. 50 Arc Bronze is outstanding for welding Aluminum Bronze Castings of many kinds. (Used for forming bearing surfaces on steel or cast iron.) Eureka's No. 52 Copper Electrode for fabricating sheet copper, bronze and copper structural shapes, cast and malleable irons - or wherever high electrical conductivity is desirable.

The Eureka organization is set up

to handle special welding rod probproblems of all kinds. Let us hear your problem -let us put our ex-perience to work in seeking a solution.

Write Today! Let us send full de-tails on the following alloy rods already perfected for special problems.



EQUIPMENT & SUPPLY CO. 720 East Grand Blvd. DETROIT, MICH

2100 tons, work at Grand Coulee dam, Wash.; bids opened.

2000 tons, contract S-3, State street subway, Chicago; bids June 29.

1100 tons, Plum beach channel bridge, superstructure, Brooklyn; Mill Basin Asphalt Co., New York, low.

1050 tons, bridges, Oswego, Allegheny and Hamilton counties, New York; bids

1000 tons. Central high school, Cleveland; bids July 6.

900 tons, public school 31, New York, for board of education.

850 tons, steel roof framing, Grand Coulee dam power plant, Washington; Columbia Steel Co., San Francisco, low.

795 tons, Raccoon creek bridge, Bridge-port, N. J., involving vertical lift span with open grating floor and four ap-proach spans; F. A. Canuso & Co., Philadelphia, low; bids June 2.

750 tons, warehouse, Armstrong Cork Co., Lancaster, Pa., Hughes Foulkrod Co., Philadelphia, general contractor.

600 tons, grade separation, Elizabeth street, Hagerstown, Md., for state.

500 tons, grade separation project, Cloquet, Minn.; bids June 23.

450 tons, bridge over Snoqualmie river, Everett, Wash.

350 tons, Warland bridge, bid 284, Warland, Mont., for United States forest

350 tons, YMCA, Wilmington, Del.

350 tons, signal bridges, various locations, for Chicago, Rock Island & Pacific railway.

330 tons, music building, Fredonia, N. Y., for state.

310 tons, state bridges, Milwaukee. 300 tons, Howell school, Cleveland; bids

300 tons, 1 June 23.

250 tons, apartment building, Winfield, Pa., Drexel Hill Construction Co., Drexel Hill, Pa., general contractor.

220 tons, repairs to track elevation, Chicago, for Chicago, Milwaukee, St. Paul & Pacific railroad.

200 tons, Baltimore & Ohio railroad, grade crossing elimination, Buffalo; bids June 19.

219 tons, three-span plate girder bridge, overall length 286 feet 8 inches, Weath-ersfield, Vt.; Edward L. Knight, South Royalton, Vt., contractor, \$72,064.64; bids June 2.

215 tons, viaduct, Fleetwood, N. Y., Westchester county park commission.

175 tons, storage and shipping building 38, for E. I. du Pont de Nemours, Philadelphia.

175 tons, plant extensions, for Kellogg & Sons, Decatur, Ill. for Spender

170 tons, infirmary building, for Vassar college, Poughkeepsie, N. Y.

161 tons, underpass, route 4, section 40, Gordon's Corner, Malapan township, Monmouth county, New Jersey; bids June 23, E. Donald Sterner, state highway commissioner, Trenton; work includes two steel beam spans, total length 120 feet; also 47 tons reinforcing steel

160 tons, bridge, route 4, sec. 40, New Jersey state highway; bids June 23.

150 tons, factory, Spencer Kellogg & Sons, Decatur, Ill.

150 tons, store, Beck Shoe Co., Phila-delphia; bids June 13.

150 tons, pipe line support, for Proximity Mfg. Co., Greensboro, N. C.

135 tons, Kelley bridge, Newburg, Me.; bids June 21, Augusta, Me. 125 tons, store building, for Montgomery Ward & Co., New London, Conn.

125 tons, bridge over Canyon creek, Ye-

gan, Mont., for Northern P. way.

125 tons, state bridge county, West Virginia. state bridge 1535

120 tons, showroom and building, for Brooklyn E Brooklyn, N. Y.

120 tons, bridge, Wheeling W Wheeling & Lake Erie rails

115 tons, factory building, for Iron & Steel Co., Brooklyn. 110 tons, bowling alley, for B

Co., Columbus, O. 105 tons, warehouse, for The Co., Elmira, N. Y.

100 tons, silk factory, Scho Philadelphia; bids June 15,

Unstated tonnage, miscellane steel doors, etc., untanking fying and other buildings, I couver, Wash.; bids to authority, Portland, June 15

Reinforcin

Reinforcing Bar Prices, Pa

Pittsburgh - Price sit somewhat firmer, although still a nervous tone which possible further weakness. ies are lighter, however, a nage is pending. There is a nage of government work come out for bids shortly. are lighter with only a few jobs involving more than placed.

Cleveland — Most fabric operating at low levels. A of school jobs and state gra ings should bolster backlos kin-Conkey Construction C land, is low on general cor Luna park housing project, volving 1050 tons. Prices ha to stiffen.

Chicago -- Demand is u with no substantial new out or large awards placed. pending job involves 3350 section S-3 of the Chicago bids June 29. In addition mately 3000 tons are activ ing for schools, garages. vators, housing projects, at laneous building construct

Philadelphia—Smaller fa shops are still fairly busy

Concrete Bars Comp

Week ended June 10 ... Week ended June 3 Week ended May 27 This week, 1938 Weekly average, year, 19 Weekly average, 1939 ... Weekly average, May Total to date, 1938 Total to date, 1939 Includes awards of 100 tons cklogs are shrinking. ue weak with jobs goas much as \$13 a ton hed levels.

Awards total about 350 gest single letting was Laclede Steel Co. for a the University of Illina. A number of small pending which should before the end of this

isco-Inquiries are limess than 100 tons. Howg business exceeds 9000 rds totaled 1399 tons, aggregate to date to compared with 44,092 ar. Consolidated Steel 500 tons for the Allan oundation building for ty of Southern Califorgeles.

wards of less than 100 ore active and several are pending involving in 500 tons, including 750 Ballard bridge, Seattle.

ang Steel Awards

ood control project, Con-er, Hartford, to Bethlehem 3ethlehem, Pa.; through F. & Co., Hartford, tonnage

commodore Perry housing Truscon Steel Co., Buffalo. ll basin bridge, MS-39-3B, N. Y., to Bethlehem Steel em, Pa.

nt and grain elevators for Mill Co., Spokane, to North-colling Mills, Seattle; Austin lloway & Georg, Spokane, stractors.

urel hill tunnel, Pennsyl-ike commission, to Truscon Youngstown, O.; Hunkin-Cleveland, contractor.

itfall sewer, Bolling field, i, to Bethlehem Steel Co., Pa.; Diamond Construction

llan Hancock Foundation niversity of Southern Cali-Angeles, to Consolidated Los Angeles.

derpass, Phoenix, Ariz., to

arehouse, Lansburg Bros., 1, to Jones & Laughlin Steel tsburgh; through Rosslyn nent Co

erans' administration buildake City, Utah; to unnamed neral contract to J. S. Metz-Los Angeles, at \$180,000.

ural resources building, Uni-Illinois, Champaign-Urbana, eph T. Ryerson & Son Inc.,

r students union building, of Illinois, Urbana, Ill., to eel Co., St. Louis; through os., Champaign, Ill.

ior-senior high school, East Y., to Strope Steel Co.,

ight house, New York Cenad, New York, to Wickwire-eel Co., New York; through wart & Co., New York.

ridge, Los Angeles county,

California, for state, to unnamed interest.

100 tons, theater, Lido Isle, Orange county, California; to unnamed interest.

100 tons, Washington state highway work, to Northwest Steel Rolling Mills. Seattle.

Reinforcing Steel Pending

3353 tons, contract S-3, State street subway, Chicago; bids June 29.

1200 tons, channel improvement, Canisteo river, Hornell, N. Y.; bids to army engineers, Binghamton, N. Y.

1050 tons, Luna park housing Cleveland; Hunkin-Conkey tion Co., Cleveland, low. Construc-

500 tons, underpass, Louisville, Ky

380 tons, federal building and postoffice, Anchorage, Alaska; McCarthy Bros. Construction Co., St. Louis, general contractor.

350 tons, gun battalion barracks, Hickam Field, T. H.; bids opened.

240 tons, section 11-B. Pennsylvania turnpike, Bedford county, Pennsylvania.

190 tons, soy bean elevator, Decatur, Ill. 176 tons, road construction; FA-33, Raymond-Epping, N. H.

175 tons, bars and mesh, Raccoon creek bridge, and by-pass, Bridgeport, N. J.; F. A. Canuso & Co., Philadelphia, low; bids June 2,

130 tons, Coca-Cola plant, Seattle; Teufel & Carlson, Seattle, general contractors. 100 tons, section 16-B, Pennsylvania turn-

pike, Fulton county, Pennsylvania.

100 tons, sewage disposal plant, Cortland,

Unstated tonnage, footings for transmission tower line; bids to Bonneville authority, Portland, June 15.

Pig Iron

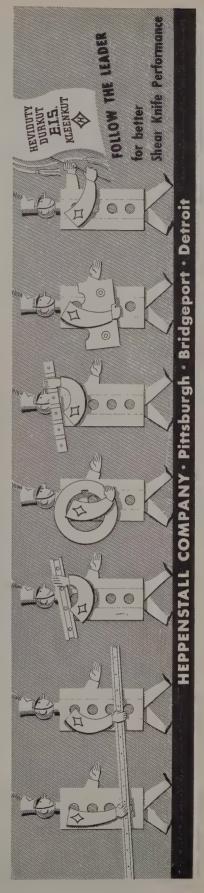
Pig Iron Prices, Page 86

Cleveland - Releases so far this month vary only slightly from May. In some instances shipments are heavier, but no definite upturn is looked for before July. Production of automotive castings will start to be influenced by new model work next month. Pig iron buying is almost entirely in small lots for prompt shipment.

Chicago—Shipments are off 5 to 10 per cent from May. Downtrend in foundry melt is believed imminent. Some foundries have maintained operations quite well, but a number report a tapering. A small amount of spot buying is going on, with no forward purchasing evident. By-product foundry coke shipments are about 25 per cent behind last month, but this was expected because of stocking done during the coal strike.

New York -- Most leading sellers have opened third quarter books at unchanged prices, and some orders have been entered for that period. However, buying generally is handto-mouth. Shipments are practically unchanged since a month ago.

Philadelphia—Pig iron buying con-



tinues hand-to-mouth, and in few instances are consumer inventories of any size. Jobbing foundries are doing well since a number of manufacturers have closed down foundry divisions the past few years. A Johnstown, Pa. interest recently bought about 550 tons of foundry iron at the auction of inventory of the Riddlesburg, Pa. furnace held by the Reconstruction Finance Corp. The price was about \$17.50 f.o.b., equivalent to \$21.50, Philadelphia. Pig iron stocks of foundries in the Philadelphia Federal Reserve district were 2440 tons as of May 1, reductions of 4.9 per cent from a month ago and 22.4 per cent from a year ago. April production of gray iron castings was 3598 tons, a decline of 11 per cent from March, but an increase of 11.8 per cent over April, Unfilled orders increased slightly.

Buffalo - Pig iron shipments are fairly steady, with buyers showing little interest in forward coverage. Blast furnace operations have risen to 57 per cent, lighting of a Republic stack giving the district eight active furnaces out of 14.

Cincinnati — Shipments indicate little change in the melt, except for a tapering in output of stove castings. Demand from machine tool

interests is well sustained. Jobbing foundries are without backlogs. Southern iron producers have delayed formal announcement of third quarter prices, but melters are not concerned with covering needs.

St. Louis-Iron deliveries so far this month have extended the sharp slump prevailing in May. Reduction in the melt is most pronounced among farm implement and stove plants. Makers of heating equipment, however, are more active. Little new business has appeared in pig iron.

Toronto, Ont.—Small melters are furnishing most new business, the total being about 1800 tons for the week. Minor reductions in prices at lake ports now are in effect, and some iron now is moving over water routes. Production in May was 18 per cent over April. Four-out of five furnaces are active, a gain of one recently.

Bolts, Nuts, Rivets

Bolt, Nut. Rivet Prices, Page 85

Some bolt and nut producers have delayed announcement of third quarter prices, although the temporary reduction during June to distributors is being met. Dem ly steady, including occasions for 1940 automobile quirements. Railroad on building and repair work ly heavier in some distri

Scrap

Scrap Prices, Page

Pittsburgh—Scrap Dr ally are higher, headed crease in No. 1 steel on chase at more than \$15. reported asking up to ! grade but with no takers road specialties are in go with prices \$1 higher si on last lists.

Cleveland — Scrap strength recently, as a limited and some railroa have been earmarked for important consumer at has covered a tonnage (ings at about \$8.50. A Cle sumer has placed some ing steel at about \$14.25 Strikes at Detroit dried source temporarily.

Chicago—Three local bought scrap lately, result eral price advances. melting steel moved up : to \$14 on sales of subs nages at both figures. melting is up similarly \$12.75. Prices bid on re testify to strength of the

Boston - Export me heavy and heavy meltir firm and unchanged. strengthening domestic business is light. Deman lots of textile and other is spotty

New York - Considera scrap has accumulated av go space, and brokers hav buying until this tonni Cast grades are easier a Domestic demand from and foundries is slack,

somewhat softer. Buffalo-Scrap has a dertone, but mills still i outstanding and no new consequence has appear weeks. Shipments again tracts have been retarded No. 1 steel continues \$13

Philadelphia—District purchased several thousa No. 1 heavy melting stee thus eliminating the low the recent range of \$15 Business also has been de eral other grades in moume, including No. 2 st range of \$13 to \$13.50, s and grate bars at \$13, her \$14.75 and old compress at \$12. Foundry grades a



HANNIFIN MANUFACTURING COMPANY 621-631 South Kolmar Avenue • Chicago, Illinois

HANNIFIN "Packless" VALVES

EP FROM YOUR TRAIN
EPS FROM ANYWHERE
COMFORTABLE
CLEVELAND
The

friendly welcome.



od that is famous.



ant, willing service.



with every detail planned for restful comfort.

Ce that saves time and taxial Cleveland adjoins the Union Terminal and Terminal group, and is at the very heart of Cleveland, Ohio.



practically unchanged. Export buying is active with some difficulty in obtaining desired tonnage. No. 1 steel readily brings \$15.25 f.a.s. Port Richmond and No. 2, \$13.75. Some is being picked up at 25 cents less.

Detroit—Sentiment among dealers is bullish despite restricted buying. Prospects for improvement in steelmaking so far have not been reflected in prices. Closing shortly on automobile lists will give the first test to current quotations.

Cincinnati—Dealers are more optimistic and are holding heavier scrap grades, although the market continues slow. Scrap shipments are maintained but coverage has not caused active bidding. Material is coming out slowly at present prices.

St. Louis — Scrap is quiet, sales and inquiries being scarce. Except for a 25 cent reduction in heavy melting steel prices are unchanged. Scant offerings provide a firm undertone. Yard stocks also are moderate.

Birmingham, **Ala.**—No activity is reported in the scrap market, which for weeks has been unusually quiet.

Seattle — Exporting houses are booking small orders for shipment to Japan, under that country's monthly allotment budget. However, the total is comparatively small. Export prices, unchanged at \$14 to \$14.50, are steadied by small stocks at tidewater. Rolling mills are filling needs at \$11 and \$12, this section of the market being somewhat easier.

Toronto, Ont.—Prices are unchanged except for a 50-cent reduction in stove plate. Mills are taking shipments against orders and have closed new contracts for about a month ahead. No. 2 steel is plentiful but No. 1 is scarce. Supplies of machinery cast are in excess of foundry demand.

Warehouse

Warehouse Prices, Page 87

Cleveland—Sales so far in June are changed but slightly from last month. Occasional gains in some directions are offset by seasonal slackening in demand elsewhere. Prices generally are steady.

Chicago — Business has increased slightly so far this month, and a small increase for June as a whole is thought not unlikely. Bars, small shapes, sheets and strip are most active

Buffalo—Business is at about the May rate which was relatively low. Prices again are fairly stable. Quiet in heavy products is restricting total demand.

Philadelphia-Volume so far this



THE cold-forging process developed by Parker-Kalon is the reason why these Parker-Kalon Products excel in so many features. And unequalled production facilities and equipment supply the reason why Parker-Kalon Cold-forged Wing Nuts, Cap Nuts, Thumb Screws and Socket Screws cost you no more. Ask for free samples and prices. No obligation, of course, Parker-Kalon Corp., 200 Varick St., New York, N. Y.



month is under May, with lighter products moving relatively better than heavy items. Price adjustments on cold finished sheets are expected shortly.

Cincinnati-Business holds at the satisfactory May level, with individual orders slightly heavier. Prices are stronger following recent adjustments.

St. Louis-Sales hold around the level of late May. Building items and oil country supplies remain fairly active, but miscellaneous needs have not expanded. Steadier prices are in prospect.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound. Copper Lake, del. Nickel Cath-Alumi-Straits Tin. Electro, New York Amer. Spot, N.Y. Casting, del. Conn. odes Midwest June refinery 9.62 1/2 49.00 4.50 20.00 12.00 35.00 $48.62 \frac{1}{2}$ 4.60 10.00 10.00 9.62 ½ 48.90 9.62 ½ 48.75 9.62 ½ 48.75 9.62 ½ 48.65 12.00 20.00 4.60 4 50 35.00 35.00 35.00 4.50 4.50 20.00 20.00 12.00 12.0010.00 48.40 10.00 10.00 4.60

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based

on 10.00c Conn. copper
Sheets
Yellow brass (high)
Copper, hot rolled
Lead, cut to jobbers8.00
Zinc, 100 lb. base9.75
Tubes
High yellow brass19.23
Seamless copper
Rods
High yellow brass
Copper, hot rolled
Anodes
Copper, untrimmed15.37
Wire
Yellow brass (high)16.73
OWN DANGER A TON

OLD METALS Nom. Del. Buying Prices No. 1 Composition Red Brass Chicago5.75-6.00 . . 6.00-6.25

 Heavy Copper and Wire

 New York, No. 1
 7.75-7.87½

 Cleveland, No. 1
 7.50-7.75

	Ce	omp	osi	tion	Brass	Borings	
st. :	Louis					7.5	0-7.75
Chic	cago,	No.	1			7.37 ½ -	7.62 ½

New York5.00-5.25

Light Copper

 New York
 6.25-6.50

 Cleveland
 5.75-6.00

 Chicago
 5.75-6.00

 Light Brass

 Cleveland
 3.50-3.75

 Chicago
 3.87½ -4.12½

 St. Louis
 3.50-3.75

 Lead

 Cleveland
 3.50-3.75

 Chicago
 3.50-3.75

 St. Louis
 3.50-3.75

Zinc
 New York
 2.50-2.62 ½

 Cleveland
 2.00-2.25

 St. Louis
 2.25-2.50
 Aluminum

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads..10.25 Standard No. 12 aluminum...12,00-12,25



GEAR TYPE Standard Torque Ring FRANCKE Standard Marine SPECIAL



a Type and Size for Every Purpose

Most complete line of forged steel couplings for all drives, all loads. Advanced design and construction improvements insure trouble-free operation. Low initial cost. Write for catalogs giving sizes, service factors, prices. No obligation.

Manufactured by JOHN WALDRON CORP.

NEW BRUNSWICK, N. J. SALES REPRESENTATIVES IN PRINCIPAL CITIES

Seattle - Business month were due in some to instability of prices. uation continues. Porti houses generally are m prices above the Seattle

Steel in Euro

Foreign Steel Prices, Pa

London—(By Cable)—S in Great Britain are procapacity, resulting in con increase in basic steel and production. The new sup try probably will have requisition production ag mal commercial contracts ry pig iron demand has slightly but hematite iro Prices of sheets, galvania and wrought iron have be ized at present levels to of October. Shipbuilders ing orders for steel.

The Continent report trade slightly quieter and tive buying is diminishi underlying market tone is as satisfactory.

Nonferrous Metals

New York - Optimism last week in nonferrous n kets as sales and shipm above expectations. Cor has improved rather than t had been expected.

Copper—Daily turnover mary market averaged tons, reflecting a five point far this month in brass m tions to about 60 per cent ity. Bare and weatherprowire eased 1/4 to 1/2 cent p due to keen competition ness, although electrolyt steady at 10.00c, Connecti port copper eased to 10. European ports, before 10.15c.

Lead—Sellers were gene to dispose of their daily is the firm price of 4.60c, East

Zinc-Despite a decline ized sheet output to 51 pe capacity, fresh demand m a weekly rate of around Prime western held at 4.50c Louis.

Tin - Prices eased fract around 48.40c for Straits many observers expect the tional Tin committee to incr tas for the third quarter at day's meeting. Supplies of appear tighter.

Ferroalloys

Ferroalloy Prices, Page

New York - Opening quarter books on ferroman expected this week at u similar action thought ther leading ferroalloys. ovement in ferromangaiegeleisen shipments this dicated by the upturn in

inports Heavy

hia — Shipments reng the week ending June 1000 tons of chrome ore 1 Africa, 555 tons of pig British India, 122 tons of shapes from Belgium, 49 rel tubes, 32 tons of steel tons of steel bars, three re rods and one ton of steron, all from Sweden.

moment

d — Machine tool orders ries are fair but spotty, in near the April and May crease in automotive buy-

and Enterprise

plant equipment.

\$50,000. Kolb & Miller, New York, architects.

ing is expected to follow settlement

of the Briggs strike which held up some tool and die work. Aircraft buying continues active, and is

viewed by toolmakers as an increasingly important outlet. District builders are sharing in some impor-

Chicago-Little change is report-

ed in machinery business. Small or-

ders have increased somewhat, but

heavy ones are almost totally lack-

ing. Inquiries are well maintained,

indicating active interest in early

purchases by a broad range of man-

road machinery, pumps and treat-

ment plant items are in best de-

mand. The marine field is rather active but lumber and logging con-

cerns are making only limited replacements. Tacoma has opened bids for 27½ tons copper wire, \$11,-

000 available. Roseburg, Oreg., will

open bids June 19 for treatment

Seattle - Electrical equipment,

ufacturing and industrial interests.

tant government awards.

NEW YORK—National Gypsum Co., Buffalo, is planning to build a onestory, 118 x 453-foot storehouse costing about \$125,000. J. H. Anderson, Marion, Pa., consulting engineer.

NIAGARA FALLS, N. Y.—New York Power authority, Albany, N. Y., is making a survey for a complete 787,000-horsepower hydroelectric development costing over \$50,000,000. G. V. Cruise, chief engineer, care of owner.

WATERLOO, N. Y.—Campbell-Vincent Co., R. Campbell, president, has purchased the old carbarns of Auburn Trolley Co., and will remodel and equip for manufacturing automobile bodies.

Pennsylvania

ERIE, PA.—City, Charles Barber, mayor, takes bids to 9 a. m., June 16, on a chlorination plant for treating sewage. Will comprise 18 chlorinating tanks and cost \$18,000. City engineer, Alexander Aitken. (Noted May 22.)

SHARON, PA.—City, Fred Williams, clerk, takes bids due at 7:30 p. m., June 23, on contracts 8, 9, 10 and 11 on a sewage disposal plant. Included are ejector station, pump station, generator station and sewage gas engine-driven generators. Lewis Burnside, city engineer.

Illinois

SOUTH PEKIN, ILL.—Commonwealth Edison Co., Chicago, plans to build a 105,000-kilowatt generating plant, and a 220,000-volt transmission line to Chicago, Total cost estimated at about \$25,000,000. Sargent & Lundy, Chicago, engineers.

SPRINGFIELD, ILL.—City, S. J. Sibley, superintendent of water, light and power, proposes to construct a power

Grant Gear makers recognize that no machine can be better than its gears. For special or standard gears, you will find complete satisfaction in Grant Gears and Grant Service.

GRANT GEAR WORKS

struction

TAND—City, Frank O. Wallene, utilities department, is taking to noon, June 16, on fuel car impment and other items for team plant at East Fifty-third ulting engineer, Peter Loftus,

DUS, O.—Quality Fixture Co. completed and will take bids 46 60 days for a two-story, bot plant costing \$40,000, J. E. blumbus, consulting engineer.

O.—Univis Lens Corp. proild a four-story factory costhan \$40,000. Project will ma-Geyer & Neuffer, Dayton,

Ni, O.—Dayton Power & Light ans for a power plant expanam to cost \$4,000,000 over the lears. Involves a 40,000-horse-/drogen-cooled turbine, two the bollers, and a 66-kilovolt amwation.

O.—Ohio Steel Foundry Co. let contracts for a one-story, 2-foot steel foundry costing Valbert Kahn Inc., Detroit, en-

N. O.—Village, J. C. Romick, as approved bond issue and WPA allotment for a water-ting an estimated \$60,000. Will soon. Project involves elevated uping and distributing systems. ason, Findlay, O., consultant.

f, O.—City, D. B. Young, mayor, ing its plans and will be ready bout June 20 on improvements etric light plant. Consulting Froehlich & Emery, Toledo, O. ay 15.)

ork

LYN, N. Y.—Sherron Metallic s plans for altering its threectory at estimated cost of

-Construction and Enterprise-

generating plant costing \$500,000 at Lake Springfield.

WOOD RIVER, ILL.—Shell Union Oil Co., Roxana, Ind., has tentative plans underway for an oil refinery to cost with equipment more than \$10,000,000.

WOODSTOCK, ILL.—Alemite Die Casting Co., Chicago, is drawing plans for a one-story, 90,000-square foot factory estimated to cost approximately \$200,000.

Indiana

EVANSVILLE, IND.—Sunbeam Electric Co., J. H. Denny, vice president in charge of engineering, has plans in progress for a 55 x 200-foot, two-story

factory addition costing \$75,000. E. C. Berendes, Evansville, architect.

INDIANAPOLIS—Nu-Way Mfg. Corp., 531 Security Trust building, has been incorporated with 1000 shares no par capital stock to manufacture machinery.

VINCENNES, IND.—Knox County Rural Electric Membership Corp., E. B. Miller, president, has \$200,000 REA allotment, and will erect 186 miles of rural electric power transmission lines.

Kentucky

MONTICELLO, KY.—South Kentucky Rural Electric Co-operative Corp., W. Dalton, president, has a \$22 allotment and will erect 2.8 rural power lines through fou

Georgia

MILLEDGEVILLE, GA.—C Ham, clerk, has voted \$33,000 to finance improvements in works costing about \$87,000. begin in August.

North Carolina

TARBORO, N. C.—Edgecom Electric Membership Corp. w \$82,000 in constructing 100 miles of rural electric lines counties, and \$60,000 for 50 m counties.

South Carolina

COLUMBIA, S. C.—South Caral Electrification authority, J. ett, director, has \$598,000 REA and will soon call for bids en of rural electric lines in three of

Tennessee

CENTERVILLE, TENN.—Me Lewis co-operative, D. Bates, a perintendent, has received a loan from REA, and will build of rural electric lines in four

KNOXVILLE, TENN.—Tenne ley authority, C. H. Garity, c purchases, takes bids to Juhydraulic turbines and gove units 3 and 4 of Wheeler powers.

Louisiana

HOMER, LA.—Clairborne Ei operative Inc., L. Almond, pres been allotted \$175,000 by REA poses to construct rural eleaggregating 231 miles in four

West Virginia

MARLINTON, W. VA.—Peerliron Corp., Charleston, W. Va., specifications and receiving June 20 for a mining plant. Rows, chief engineer.

WEIRTON HEIGHTS, W. Carl Frankovitch, solicitor, is pl construct a water distribution ing more than \$75,500. Norman Hancock county engineer.

Missouri

AFFTON, MO.—Affton Sanita district, W. C. Plumb, presider ceiving bids for a sewage dispo George S. Russell, St. Louis, (Noted April 17.)

Minnesota

DULUTH—Elliott & Co., meat have awarded contract to Berg Gustafson, Duluth, for a packi addition costing \$150,000 with extensionlen, Everds & Cromble, engineers.

MADISON, MINN.—City, Janden, clerk, is receiving bids p.m., June 14, on power plant ments including new coal and dling equipment, smoke stack, ter heater and combustion contkins & McWayne, Sioux Falls, consultants.

ST. PAUL—Donaldson Co. Inc facturer of air purifiers and ausories, has awarded contract to & Simpson, Minneapolis, for a & foot, one-story factory addition.



"CLOSE-UP" of Achievement



BELLEVUE STRATFORD

IN PHILADELPHIA

Claude H. Bennett General Manager Limelighted leaders of business . . . sophisticated socialites . . . people in the front rank of important activities always choose the Bellevue. It has distinguished friends all over the world. Air Conditioned Restaurants Include Historic Philadelphia

in your Itinerary.

Hold a horsepower in your hand with this revolutionary small diameter motor. Utmost simplicity cuts weight more than one-half. No gears, brushes, commutator, moving wires or centrifugal switch. No complicated accessories. Uses 220-volt, 3-phase, 60-cycle current at 3600 r.p.m. Patented features.

The Sawyer Hi-Power Aerial Grinder has a power-to-weight ratio that is higher than that of any other tool of its kind. Rated at $1\frac{1}{2}$ h.p., it has a pullout of nearly $3\frac{1}{2}$ h.p., and will operate on 50% overload for hours without danger to the windings. Small overall diameter ($4\frac{\pi}{4}$) provides maximum "get-at-ability" in service. Overall length, 24". Grinding clearance, 2". Totally enclosed motor—dust-proof, splash-proof, drip-proof. Thoroughly ventilated.

th weight-saving mo-1½ and 2 h.p. Aerial 3½ h.p. Suspended 5. External Tool Post

ed, Heavy Duty Type I Pedestal Type with

ve illustrated folder.

Apples, California



INBRAKO

SELF-LOCKING
LLOW SET SCREWS
with the Knurled Points

pay their Way
Greater Safety

ing around the cup point ad automatically locks we in place so that once the third three's no chance for thake, jar or vibrate loose.



Fig. 1641 Pat. Applied For

two the usual hex bar-wrench and the screws used over again. Don't risk trouble. Specify the at won't fail you. Send for full details and

NDARD PRESSED STEEL Co.

JENKINTOWN, PENNA.

BRANCHES

ANAPOLIS

BOX 579

ST. LOUIS

Plan for Lower Costs



WITH CURTIS AIR CYLINDERS

Costs can be cut, with a corresponding increase in net profits, by doing many push, pull and lift jobs more efficiently, more economically and in less time with Curtis Air Power Cylinders. Because of their simplicity, low installation cost, negligible maintenance expense and long life, important savings are almost inevitable wherever they can be used.

Curtis Air Power Cylinders or Hoists do their work steadily and efficiently for many years with a minimum of attention as a result of simple design (one moving part) and rugged construction. Control is easy and accurate. Power cost is low. Not subject to injury from overloading or bad atmospheric conditions.

FIND OUT how Curtis Air Power Cylinders and Hoists can increase efficiency and profits in your plant. Send in the coupon for our new 28-page booklet, "How Air is Being Used in Your Industry."

CURTIS

	Compressors	۰	Air & Hydraulic Cylinders
1	Air Hoists •	П	-Beam Cranes & Trolleys
			_

1	CURTIS PNEUMATIC MACHINERY COMPANY 996 Kienlen Avenue, St. Louis, Mo. 996 Kienlen Pleace send me the new 28-page booklet, Gentlemen: Pleace send me true new 28-page booklet, "How Air is Being Used in Your Industry." Name Street Street State	
	City	

Texas

BORGER, TEX.—Phillips Petroleum Co., Bartlesville, Okla., is enlarging its refinery here and installing additional equipment at cost of \$750,000. S. Learned, Bartlesville, consulting engineer.

HEREFORD, TEX. — Smith County Electric Co-operative Inc. has plans in progress for 224 miles of rural electric transmitting lines in three counties at cost of \$147,000. William G. Morrison, Dallas, Tex., engineer.

ORANGE, TEX. — Sabine Supply Co. takes bids in late summer on a $100~\mathrm{x}$

135-foot fireproof warehouse costing \$50,000. W. E. Simpson Co., San Antonio, Tex., consulting engineer.

Kansas

KANSAS CITY, KANS.—Phillips Petroleum Co., Bartlesville, Okla., proposes to enlarge its oil refinery here with additional stills, lubricating oil equipment, tanks and pumps. Cost is estimated at \$800,000. S. Learned, Bartlesville, engineer.

Nebraska

ALLIANCE, NEBR.—City, R. W. Laing,

clerk, takes bids to 7:30 p on one steam generator in to be installed in muniplant. Certified check 5 per company bid. Black & ver City, Mo., consulting engine

GERING, NEBR.—City h state railway commission to erect proposed system tric transmission lines.

HASTINGS, NEBR.—Neling Co., M. H. Robineau, preto build an oil refinery cost mately \$400,000 and requirable equipment.

Iowa

CLINTON, IOWA—Clinte poses to construct a power install three steam generate other electrical equipment of \$960,000. Project will year.

DE WITT, IOWA—Frankling Co., maker of dishwash mercial use, has acquired a will remodel and equip it furing purposes.

KELLOGG, IOWA — Mic Stamping Co. has begun cor a 60 x 265-foot, one-story fi tion costing about \$60,000, facturing washing machines

LOVILLA, IOWA—Blackst has begun construction of a ing plant and will install m equipment for ten grades of pacity 1000 tons daily.

SIOUX CITY, IOWA—Till has been incorporated with tal to operate a general foun Egil T. Miller, president.

SIOUX CITY, IOWA—Woo Electrid co-operative, Dale project superintendent, has plans for another rural e erating and transmission up

Colorado

FT. COLLINS, COLO.—Cinstall in its power plant a generator, furnace and bolleing \$321,000 in all. Has PWA funds.

LAMAR, COLO.—REA 1 \$533,000 to the Southeas Power association to finan rural electric power lines.

Nevada

WEEPAH, NEV.—Weepah ing Co. plans to construct \$40,000 a 250-ton cyanide Schrader, Weepah, consult

Pacific Coast

ROSEBURG; OREG.—City, recorder, receives bids June chanical equipment and apt to be installed in propose plant.

Canada

WATERWAYS, ALTA.—S Equipment Ltd., R. W. Ros Regina, Sask., is preparing plant to extract oil and off from tar sand. Cost estimat 000.

MONTREAL, QUE.—City commission has voted \$50 pumping station with elev for Little St. Pierre River tem. J. A. Blanchard is p director.

MR. PROGRESSIVE MACHINE TOOL BUILDER

If you use

HOLLOW BORED FORGINGS, LATHE SPINDLES, PISTON RODS, HYDRAULIC CYLINDERS, CLUTCH SHAFTS or RAMS

would you be good enough to let us tell you our story? We've been specialists in this line for 21 years, and we are in a position to fill your orders promptly, efficiently and at a satisfactory cost. We are, the

AMERICAN HOLLOW BORING COMPANY.

1054 W. 20th ST., ERIE, PA.





)RNAMENTAL—INDUSTRIAL

For All Purposes 60 Years of Metal Perforating Prompt Shipments

Send for Metal Sample Plates

THE ERDLE PERFORATING CO.
71 York Street Rochester, N.Y.



SCREENS of Perforated Metal



Harrington & King

5634 Fillmore St., Chicago, Ill. New York Office—114 Liberty St.



RODS • Free Turning Yellow Brass in all tempers to suit the job; Free Machining Nickel Silver Rods; "Redaloy" Rods to match bronze hardware at quite a saving in cost over the usual commercial bronze rods; "Resistaloy"

Rods where corrosion resistance is a factor; "Hitensiloy" a rod of high tensile strength, yet retaining comparative free machining qualities; Muntz, Naval, Manganese and Forging Rods. Special alloy rods furnished to suit customer's requirements.

METAL MANUFACTURING COMPANY

Sules Offices in NEW YORK

BELLEFONTE, PENNA

ONAL Silica FIRESTONE

The Ideal Material for Lining . . .

PITS — BLAST FURNACE LADLES — BESSEMER ERS — AIR FURNACES — ACID PICKLING TANKS — DROP FORGE BOTTOMS — CUPOLAS

NATIONAL STONE COMPANY

lwood City, Pa.

Phone Beaver Falls 61



Serving American Industry Since 1884 — Overhead Electric Cranes and Hoists Crawler Cranes • Electric Motors • Arc Welders • Welding Electrodes.

Harnischfeger Corporation
411 W. National Ave., Mijwauket, Wis.

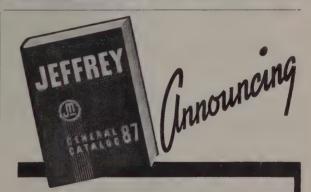
It Galvanized by-

eph P. Cattie & Bros., Inc. aul & Letterly Sts., Philadelphia, Pa.

ladelphia's Oldest, The Country's Largest Hot Dip Job Galvanizer

vanized Products Furnished





A 960-PAGE reference book containing valuable information on the complete line of Jeffrey chains, reduction and all types of material handling equipment.

Data is so presented that the engineer can incorporate this class of equipment in his plans with little trouble or effort. Your files are not complete without a copy of this piece of literature.

The coupon below is for your convenience (or make request on company letterhead) . . fill it in and mail.

The Jeffrey Manufacturing Company 889-99 North Fourth St., Columbus, Ohio Please send me a copy of Catalog No. 87.				
Name				
Position				
Company				
Address				

RYERSON CERTIFIED STEELS

represent the highest quality obtainable in each class and type of material. All kinds from standard carbon grades to special alloys in stock for Immediate Shipment. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.



BROOKE IRON CO. BIRDSBORO, PENNA.

HIGH GRADE

FOUNDRY BASIC MALLEABLE BESSEMER

LOW PHOS



Detachable and Riveted Chain, Malleable Washers, Oarlocks. Catalogues on re

PEORIA MALLEABLE CAST PEORIA, ILLINOIS, U.

C. H. HUNT

CONSULTING ENGINER

Specializing in Consultation on General Steel Mill and Industrial Plant

First National Bank Bldg., Pittsburgh Phone ATlantic 9885





STAINLESS SHEETS & STRIP STEEL POLISHE

By the Excelsior Method as required for your job in process will reduce your Extra No. 4 Finishing Cost 75%

For particulars address EXCELSIOR TOOL & MACHINE CO., EAST ST. LOUIS, ILLING

BELMONT RON PHILADELPHIA NEW YORK RONWORKS EW YORK

Engineers - Contractors - Exporters STRUCTURAL STEEL-BUILDINGS & BRIDGES RIVETED-ARC WELDED

BELMONT INTERLOCKING CHANNEL FLOOR

Write for Catalogue
Main Office—Phila., Pa. New York Office—44 Whitehall St.

JAMES CRISWELL COMPA

Furnace Engineers & Contracto

Open Hearth, Soaking Pits and heating furnaces

Keenan Bldg.

Pittsburgh

SMALL ELECTRIC STEEL CASTINGS

(Capacity 500 Tons Per Month)

WEST STEEL CLEVELAND "He Profits Most Who Serves Best"



CASTING CO. OHIO, U.S.A.

Better Steel Castings

JIGS - FIXTURES - SPECIAL MACHI PUNCHES-DIES-"to your measure

Let our trained engineers apply our 33 years' experience equipment problem. Our successes in other plants of all to proved methods assure a solution of any question involving tion machinery. Write us in detail without obligation.

THE COLUMBUS DIE, TOOL AND MACHIN COLUMBUS, OHIO

TOLEDO STAMPINGS

Our Engineering Department has had long experience in working out difficult stamping problems. We want to work with you on your development work as we have had great success in changing over expensive parts and units into steel stampings. Our produc-tion facilities can amply take care of almost all stamping requirements. Give us the opportunity of working with you.

We Solicit Your Prints and Inquiries

Toledo Stamping and Manufacturing Co. 90 Fearing Blvd., Toledo, Ohio Detroit Office: Stormfeltz-Levely Bldg., Detroit, Mich. Chicago Office: 333 North Michigan Ave., Chicago, Ill.

CROSBY FOR STAMPIN

All our efforts have been concentrate on one product - - STAMPINGS for more than 40 years. We have mad stampings, deep, intricate, heavy, light large and small, for nearly every branc of industry.

THE CROSBY COMPAN

Buffalo, N. Y.

assit

HELP WANTED

Single Insertion—50c per line Three to Six Insertions—48c per line Six or more Insertions—45c per line

Seven words of ordinary length make a line.
FIRST LINE IN BOLD FACE TYPE A box number address counts as one line.

POSITIONS WANTED

Single Insertion—25c per line Three to Six Insertions—24c per line Six or more Insertions—23c per line

ment For Sale

Press 8" Str. Tle Rod.
5 Turret Lathe, S.P.D.
a Std. Sheet Leveliers, M.D.
riction Saw, M.D. 220/3/60.
n Crane 47'5½" span, 220 V.DC.
ar Cutter, 60'x111", M.D.
nd Planer, B.D.
Roll Grinder, M.D.
Betts Bor. Mills.
PENN MACHINERY CO.
use Bidg., Pittsburgh, Pa.

HRONOUS M. G. SETS

A. C. 600 RPM, 275 V. DC G. E. 900 RPM, 250/125 V. DC G. E. 900 RPM, 600 V. DC G. E. 720 RPM, 275 V. DC G. E. 720 RPM, 600 V. DC G. E. 720 RPM, 275 V. DC G. E. 1200 RPM, 275 V. DC G. E. 1200 RPM, 275 V. DC G. E. 1200 RPM, 600 V. DC

D ELECTRIC COMPANY

lex 4508 Tank Jacks Saddles for same\$1.50 each

RSON-SCHEURING TANK CO.

Indianapolis, Ind.

6 lis-"1 Ton or 1000"

3-500 tons—All sections—All Sizes.
RAILS—25,000 tons—All Sections—
reactically as good as New.
IES—Every Track Accessory carried
Angle and Splice Bars, Bolts, Nuts
Itches, Tie Plates.
One Source—Saze Time and Money
'Phone Write or Wire

DSTER COMPANY, Inc.

EINE CORRUGATING ROLLS ESS 400 TON N-B-P, LATE DDUCTION Polisher for tubing sworth, 5122 St. Clair, Cleveland

Intal Finishing

PENNSYLVANIA

PHIA RUST-PROOF CO., 3229
Ave., Philadelphia. Electrodmium; tin; zinc; chromium;
kel and silver; Anodizing of
by Alumilite process Parkerirdizing; Bonderizing.

Castings

OHIO

STEEL CASTING CO., Cleve-y equipped for any production Two 1% ton Elec, Furnaces, high grade light steel castings, castings subject to wear or

PENNSYLVANIA

WALES MACHINE CO., INC., es. Grey Iron, Nickel, Chrome, m Alloys. Semi-steel. Superior cehine and hand molded sand umbled.

Employment Service

SALARIED POSITIONS \$2,500 to \$25,000

This thoroughly organized advertising service of 29 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been \$2,500 or more send only name and address for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

Help Wanted

WANTED: EXPERIENCED FOUNDRYMAN as Superintendent of Open Hearth and

Electric Steel foundry. Apply, giving experience in full, age and references, directly to The Detroit Steel Casting Company, Detroit, Michigan.

Opportunities

Positions Wanted

AN EXCEPTIONAL SALES, SALES PROMOTION OR ADVERTISING MANAGER IS AVAILABLE. THIS MAN HAS A RECORD WHICH SHOULD BE OF INTEREST TO ANY COMPANY IN NEED OF A COMPETENT EXECUTIVE. EXPERIENCE—ADVERTISING AGENCY, WHOLESALES MANAGER, MANUFACTURERS SALES MANAGER, MANUFACTURERS SALES PROMOTION MANAGER. WILL GO WHEREVER THERE IS AN OPENING. PREFERS SALARY AND COMMISSION ARRANGEMENT. ADDRESS BOX 914, STEEL, 110 East 42nd St., New York City.

ARE YOU PROPERLY REPRESENTED IN the Pittsburgh district? If your product can be used by the steel plants, foundries and other industrial concerns, my years of contact among the production and purchasing executives will increase your sales in this territory. Address Box 916, STEEL, Konners Blde., Pittsburgh, Pa.

AM LOOKING FOR ONE PRODUCT salable to industrial concerns located in the Pittsburgh District. Ten years' contact with production and purchasing executives gives me entree into the leading concerns in this district. Prefer a product which is well known. Address Box 917. STEEL, Penton Bldg., Cleveland.

EXPERIENCED SALESMAN DESIROUS representing Hammered Forging concerns.

EXPERIENCED SALESMAN DESIROUS representing Hammered Forging concern; commission basis; Chicago and vicinity. Address Box 920, STEEL, Penton Bidg.,

Opportunities

INDUSTRIAL RELOCATION

LARGE INDUSTRIAL PLANT being split into parcels and now offered at prices comparable to one year's rental elsewhere.

Through cooperation of former owners and local Chambers of Commerce, these building groups are available at prices barely in excess of the salvage value of the materials. We have excellent building groups suitable for various classes of industries. All have excellent rail and truck shipping facilities. Locations at Cambridge, Ohio; New Eagle and Greenville, Pa. Send for complete information.

HETZ CONSTRUCTION CO. INC.

Griswold St.

WARREN, OHIO

Phone 4474

+ + ADVERTISING INDEX +

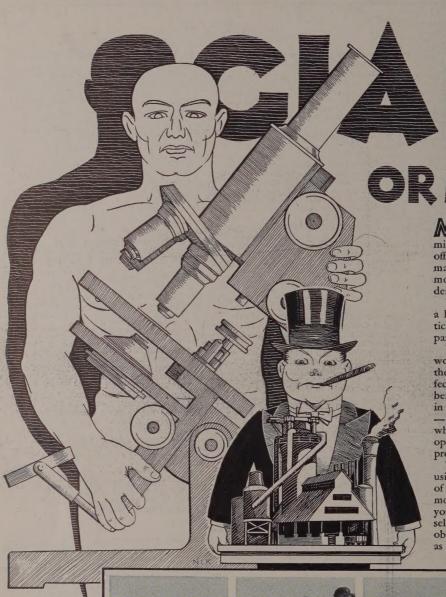
Where-to-Buy Products Index carried in first issue of month.

Page	Page	
A	Bullard Co., The —	Fitzsimons Co., The
to due Co Division of Cimenda Saw	Bundy Tubing Co	Flinn & Dreffein Co. Foote Bros. Gear & Machine
Abrasive Co., Division of Simonds Saw & Steel Co	C	Ford Chain Block Division
Acme Galvanizing, Inc		can Chain & Cable Co., Inc
Acme Steel & Malleable Iron Works —	Cadman, A. W., Mfg. Co	Foster, L. B., Inc.
Ahlberg Bearing Co	Carborundum Co., The	Foxboro Co., The
Air Reduction Sales Co	Carter Hotel	G
Ajax Electric Furnace Corp	Cattie, Joseph P., & Bros., Inc 105	Gardner Displays
Ajax Electrothermic Corp	Chain Belt Co	Gas & Coke Division of Kopp.
Alan Wood Steel Co	Chain Products Co	General Electric Co.
Allegheny Ludlum Steel Corp	Chicago Electric Co 107	General Electric Co., Inca- Lamp Dept
Allen-Bradley Co	Chicago Perforating Co 105	General Electric Vapor Lamp
Alliance Machine Co., The —	Chicago Rawhide Mfg. Co	Goodyear Tire & Rubber Co.
Allis-Chalmers Mfg. Co. Inside Front Cover Alpha-Lux Co., Inc., The	Cincinnati Grinders, Inc — Cincinnati Milling Machine Co —	Gordon Lubricator Division
American Agile Corp 95	Cincinnati Shaper Co., The	Knox Co
American Brass Co., The	Clark Controller Co	Grant Gear Works
American Bridge Co 41	Clark Tructractor, Div. Clark Equip-	Great Lakes Steel Corp
American Chain & Cable Co., Inc., Ford Chain Block Division	ment Co. — — — — — — — — — — — — — — — — — — —	Greenfield Tap & Die Corp.
American Chain & Cable Co., Inc.,	Cleveland-Cliffs Iron Co	Gregory, Thomas, Galvanizin, Gulf Oil Corporation
Page Steel & Wire Division 93	Cleveland Crane & Engineering Co	Gulf Refining Co
American Chemical Paint Co	Cleveland Hotel	
American Engineering Co 81 American Gas Association	The —	H
American Gas Furnace Co —	Cleveland Tramrail Division, Cleveland	Hagan Corporation, The
American Hammered Piston Ring Di-	Crane & Engineering Co 80	Hagan, George J., Co Hallden Machine Co., The
vision of Koppers Co	Cleveland Twist Drill Co	Hanlon-Gregory Galvanizing
American Hollow Boring Co 104 American Hot Dip Galvanizers' Asso-	Cleveland Worm & Gear Co., The Inside Back Cover	Hanna Furnace Corp
ciation	Climax Molybdenum Co	Hannifin Mfg. Co.
American Lanolin Corp —	Colonial Steel Co	Harnischfeger Corp. Harrington & King Perforation
American Metal Hose Branch of The American Brass Co	Columbian Steel Co	Hays Corp., The
American Monorail Co	Columbian Steel Tank Co	Heald Machine Co., The
American Pulverizer Co	Continental Roll & Steel Foundry Co. —	Helmer-Staley, Inc.
American Roller Bearing Co 91	Continental Screw Co 7	Hetz Construction Co.
American Rolling Mill Co., The — American Screw Co	Corbin Screw Corp. 7 Cowles Tool Co	Hevi-Duty Electric Co.
American Stew Co	Crane Co. —	Hilliard Corp., The
American Steel & Wire Co	Criswell, James, Co 106	Hillside Fluor Spar Mines
American Tinning & Galvanizing Co. —	Crosby Co., The 106	Hindley Mfg. Co Hodell Chain Co., The
Amsler-Morton Co., The	Cullen-Friestedt Co	Horsburgh & Scott Co
Anaconda Wire & Cable Co	Curtis Pneumatic Machinery Co 103 Cyclone Fence Co	Houghton, E. F., & Co.
Apollo Steel Co —	· ·	Hubbard, M. D., Spring Co.
Armstrong Cork Co	D	Hunt, C. B., & Son Hunt, C. H.
Atlantic Stamping Co	Domesous Steel Costine Co	Huther Bros. Saw Mfg. Co.
Atlas Drop Forge Co	Damascus Steel Casting Co. — — — — — — — — — — — — — — — — — — —	Hyatt Bearings Division, Gen-
	Davis Brake Beam Co	tors Sales Corporation
В	Detroit Leland Hotel —	Hyde Park Foundry & Mach:
The last of the la	Diamond Expansion Bolt Co., Inc	I
Babcock & Wilcox Co. 67 Bailey, Wm. M., Co. —	Dravo Corp., Engineering Works Div. 53 Dravo Corp., Machinery Division	Independent Galvanizing Co.
Bantam Bearings Corp	Duer Spring & Mfg. Co	Industrial Brownhoist Corp.
Barber-Colman Co	2 0	Ingersoll-Rand Co
Barnes, Wallace, Co., The, Division of	E	Inland Steel Co
Associated Spring Corporation — Bartlett Hayward Division of Koppers	Eastern Gas & Fuel Associates	International Nickel Co., Inc.
Co	Electric Controller & Mfg. CoBack Cover	Irwin, H. G., Lumber Co
Bay City Forge Co	Electric Furnace Co., The —	*
Bellevue-Stratford Hotel 102	Electric Storage Battery Co	Youlegan Inon & Steel Co. Thu
Belmont Iron Works	Electrochemical Processes Division Blaw-Knox Co	Jackson Iron & Steel Co., The James, D. O., Mfg. Co.
Berger Manufacturing Div., Republic	Electro Metallurgical Co	J-B Engineering Sales Co.
Steel Corp 12 13	Elwell-Parker Electric Co	Jeffrey Mfg. Co
Bethlehem Steel Co	Emerson-Scheuring Tank Co 107	Jessop, Wm., & Sons, Inc.
Birdsboro Steel Foundry & Machine Co	Engineering & Construction Division of Koppers Co	Johns-Manville Corp. Jones & Laughlin Steel Corp.
Blaw-Knox Co	Erdle Perforating Co	Jones, W. A., Foundry & Mac
Blaw-Knox Division, Blaw-Knox Co —	Erie Foundry Co —	Joslyn Co. of California
Blaw-Knox Sprinkler Div., Blaw-Knox	Eureka Fire Brick Works —	Joslyn Mfg. & Supply Co
Co	Excelsior Tool & Machine Co 106	к
Brassert, H. A., & Co 90	${f F}$	Kardong Brothers, Inc.
Bridgeport Brass Co.	The first transition of the same of the sa	Keagler Brick Co., The
Brooke, E. & G., Iron Co. 106 Brookmire Corporation —	Fairbanks Morse & Co	Kemp, C. M., Mfg. Co.
Boston Tow Boat Co.	Fairbanks, Morse & Co	Kidd Drawn Steel Co Kidde, Walter, & Co
Brosius, Edgar E., Inc.	Farrel-Birmingham Co., Inc —	King Fifth Wheel Co.
Brown & Sharpe Mfg. Co	Farval Corp., The	Kinnear Manufacturing Co.
Brown Instrument Co., The — Buffalo Galvanizing & Tinning Works,	Federal Shipbuilding & Dry Dock Co — Finn, John, Metal Works	Koppers Coal Co. The
Inc	Firth-Sterling Steel Co	Koppers Coal Co., The Koppers-Rheolaveur Co

ADVERTISING INDEX + +

Where-to-Buy Products Index carried in first issue of month.

	Brother, Inc	age	Page	Page
136		-	P	T
)		Page Steel & Wire Division of Ameri-	Tar & Chemical Division of Koppers
	L		can Chain & Cable Co., Inc 93	Co
		-	Parker-Kalon Corp	Tennessee Coal, Iron & Railroad Co Thomas Machine Manufacturing Co. 94
13	able Co	-	Peabody Engineering Corp —	Thomas Steel Co., The 89
35	ons Co., The	7	Penn Galvanizing Co	Thomson-Gibb Electric Welding Co — Tide Water Associated Oil Co —
6		-	Pennsylvania Salt Mfg. Co	Timken Roller Bearing Co Front Cover
12	Steel Co	106	Penola, Inc. — — — — Peoria Malleable Castings Co	Timken Steel & Tube Division, The Timken Roller Bearing Co
	up Co	- 10	Perkins, B. F., & Son, Inc —	Tinnerman Stove & Range Co 35
C	Inc	_	Pheoll Mfg, Co	Titan Metal Mfg. Co
	al Steel Co	-	Pittsburgh Crushed Steel Co	Toledo Stamping & Mfg. Co 106 Tomkins-Johnson Co
la d	& Machine Division of		Pittsburgh Electromelt Furnace Corp. —	Torrington Co., The —
	Co., The	-	Pittsburgh Plate Glass Co — Pittsburgh Rolls Division of Blaw-	Towmotor, Inc. — Tri-Lok Co. —
	Co	-	Knox Co	Truscon Steel Co
	cts Co., The	11	Pittsburgh Steel Co	U
	15 D	_	Power Piping Corp —	
	ing Corp		Pressed Steel Tank Co	Union Carbide & Carbon Corp 11 Union Carbide Sales Co 11
1	Co	-	Progressive Mfg. Co	Union Drawn Steel Div., Republic
	Me		Pure Oil Co., The	Steel Corp
		-		United Engineering & Foundry Co —
	Co	-	R	United States Rubber Co
e i	s Co	T	Raymond Mfg. Co., Division of Asso-	
	M		ciated Spring Corp —	American Bridge Co,
Hn	phill Co		Reliance Electric & Engineering Co. — Republic Steel Corp	American Steel & Wire Co. Carnegie-Illinois Steel Corp.
	Machinery Co	(Property)	Research Corp	Columbia Steel Co.
	ck Co., The	-	Riverside Foundry & Galvanizing Co. — Roper, Geo. D., Corp. — —	Cyclone Fence Co. Federal Shipbuilding & Dry Dock Co.
9.		_	Ruemelin Mfg. Co	National Tube Co.
	Corp	_	Russell, Burdsall & Ward Bolt & Nut	Oil Well Supply Co. Scully Steel Products Co.
(Co	-	Ryerson, Joseph T., & Son, Inc 106	Tennessee Coal, Iron & Railroad Co.
	t Corp.	_		United States Steel Products Co. Universal Atlas Cement Co.
g	Mill Corp		S	Virginia Bridge Co.
	roducts Co		Ct Togonh Tood Co	United States Steel Products Co8, 9, 41 Universal Atlas Cement Co
U	Co		St. Joseph Lead Co	Chiversal Atlas Celifolic Co
e	ring Co	_	Samuel, Frank, & Co., Inc	v
	ks		San Francisco Galvanizing Works. — Sanitary Tinning Co., The —	Valley Mould & Iron Corp —
	p Co	_	Sawyer Electrical Mfg. Co 103	Vanadium Corp. of America — Virginia Bridge Co —
			Scovill Mfg. Co	Vulcan Steam Forging Co
	N		Searles Electric Welding Works	W
	Steel Co		Shafer Bearing Corporation ————————————————————————————————	
de	g Metals Corp		Manning, Maxwell & Moore, Inc —	Wagner Electric Corp — Waldron, John, Corp 100
Co	orp	82	Shell Union Oil Corporation — Shenango Furnace Co., The —	Washburn Wire Co —
	& Ordnance Co	-	Shenango-Penn Mold Co	Wean Engineering Co., Inc — Weirton Steel Co 6
De:	r & Creosoting Co	-	Shepard Niles Crane & Hoist Corp — Shuster, F. B., Co., The	Welding Equipment & Supply Co 96
&	Foundry Co & Mfg. Co	7	Simonds Gear & Mfg. Co	Wellman-Smith Owens Eng. Corp. Ltd. — Western Precipitation Corp —
C	orp,6,	102	Simonds Saw & Steel Co 75	Westinghouse Electric & Mfg. Co —
4	Co	105	Sipe, James B., & Co	West Penn Machinery Co
2 1	Co	_	Sleeper & Hartley, Inc	Whitcomb Locomotive Co., The, Div.,
e,	Division General Mo-		Snyder, W. P., & Co	The Baldwin Locomotive Works — Whitehead Stamping Co —
Co	oal & Coke Co	_	Spowers, W. H., Jr	White Tar Co. of New Jersey, Inc —
ne	Co	man.	Standard Galvanizing Co	Wickwire Brothers — Wickwire Spencer Steel Co 69
	v Jersey Lubricant Co. e & Tool Works	_	Standard Steel Works Co	Wilcox, Crittenden & Co., Inc —
ro	ducts Div., Republic	46	Standard Tube Co	Wilson, Lee, Engineering Co — Wilson Welder & Metals Co., Inc —
ini	Bearings Corp	13	Steel & Tubes, Inc	Wisconsin Steel Co
e		, 60	Steel Founders' Society of America . 16 Stewart Furnace Division, Chicago	Witt Cornice Co., The —
			Flexible Shaft Co —	Wood Preserving Corp., The — Worthington Pump & Machinery Corp. —
	0		Stop-Rust Co., The	Worth Steel Co 14
Mi	fg. Co	105	Strong Steel Foundry Co	Wyckoff Drawn Steel Co
loy	s Corp	63	Sturtevant, B. F., Co	Y
inc	Crane Co	105	Superior Steel Corp	Yale & Towne Mfg. Co
ly	Co	-	Surface Combustion Corp —	Youngstown Alloy Casting Corp — Youngstown Sheet & Tube Co 55
ci	ie Co	11	Syracuse Hotel	Tours Brown Direct Le Made Control of



MODELS of comills that operate right office, and microscopes b

man . . . such miniature models can clearly and demonstrate your product We will build you a w

We will build you a was a house so you can see wick. Models can be cut a parent to show the actus

You can equip your sworking models. As they the models, actually work fective as though the real being demonstrated. Mode in so many ways,—at ind—showrooms,—window wherever and whenever opportunity to attract atterproduct.

True, almost all large using models today, but so of smaller organizations. In modest your budget, or your product, you can use to sell. Why not write to obligation we will be glad as to how you, too, can



3-foot exact scale model of P.R.R. Locomotive. Constructed for Westinghouse E. & M. Co.



Quarter-inch scale model of Glass, Inc. Building at New York World's Fair.



15-foot high reproduction of microscope, exact in every detail.



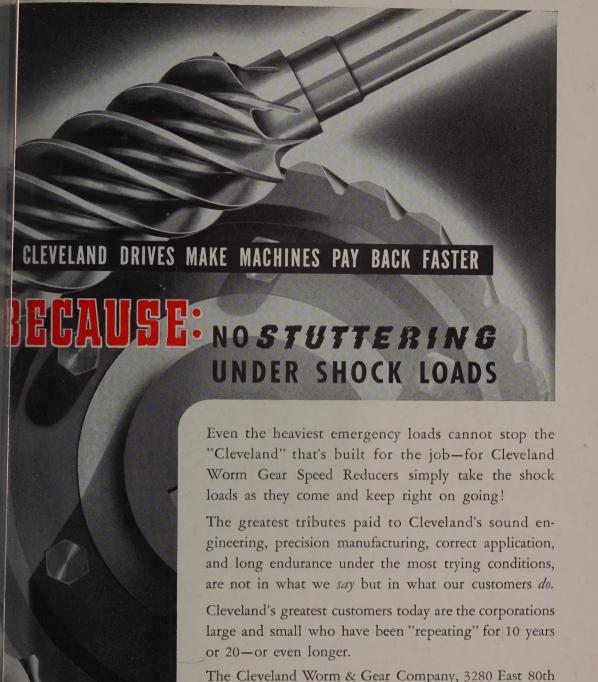
Enlarged tradem The head moves he growls.

The use of miniature or giant models of your product in your business deserves consideration. Write us regarding our service, or ask to be placed on the mailing list for our free monthly publication "Industrial Showmanship."

GARDNER

PITTSBURGH 477 Melwood St. NEW YORK 42-50 21st St., L. I. City DETROIT
New Center Bldg.

1130-



CLEVELAND NORM GEAR PREED Reducers

Street, Cleveland, Ohio.

Affiliate: The Farval Corporation, Cleveland, Manufacturers of Centralized Systems of Lubrication

